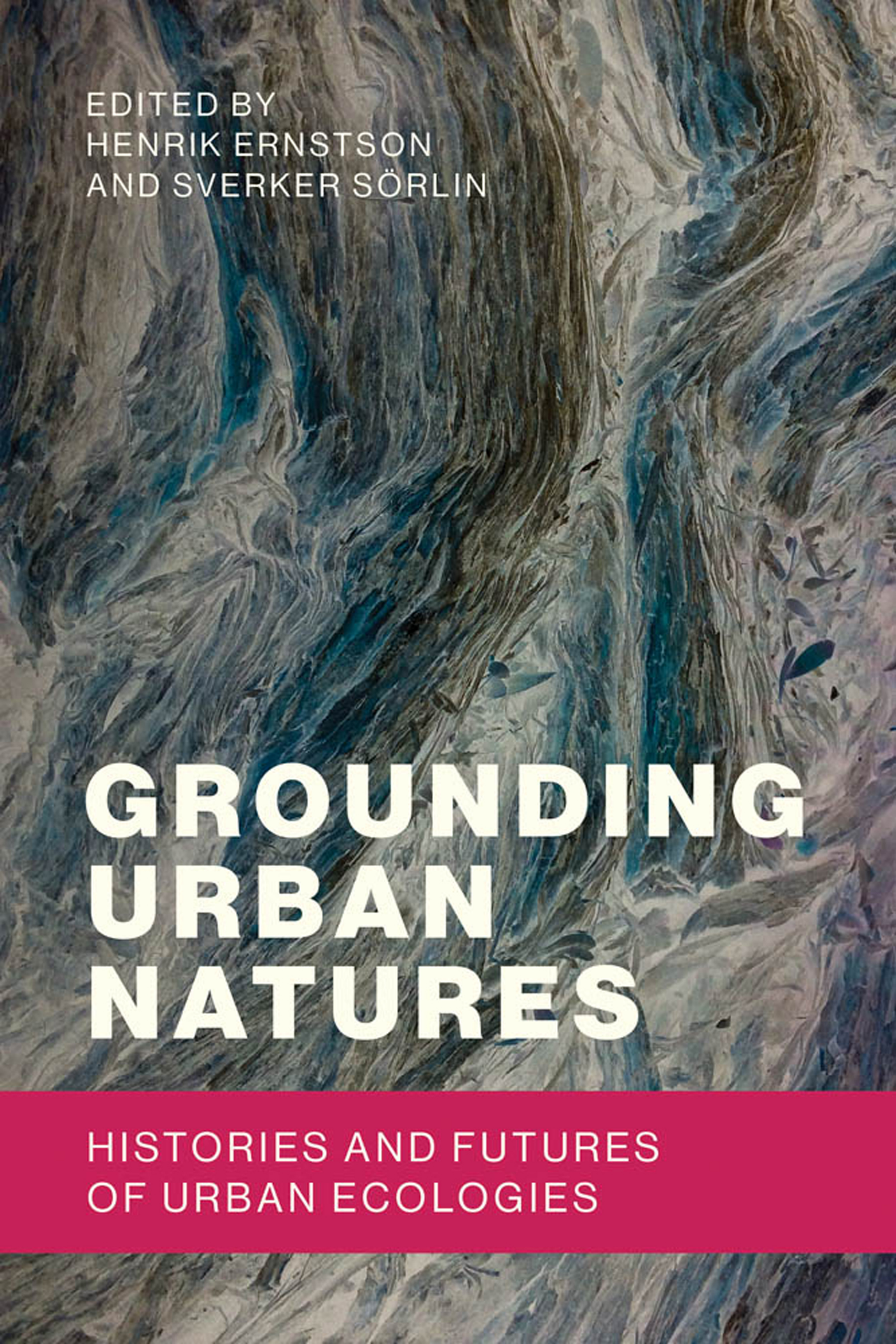

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GROUNDING URBAN NATURES

HISTORIES AND FUTURES OF URBAN ECOLOGIES

Protection Program that entered into force in 1988 was harmonized with a development-oriented land-use plan that represented only a modest version of the original proposal for a Biotope Protection Program. Moreover, the legal status of the earlier program was rather weak so that its provisions could easily be sacrificed when they were in conflict with "overarching public interests." The pressure to develop was particularly strong in the aftermath of unification, when the urban railway system was extended and many former wastelands in the central area were rebuilt with shopping centers and governmental buildings of the newly designated German capital. It was only due to the legal requirement of compensation planning that claims for biotope protection could be realized. Thus, the two landmark projects of biotope protection in post-unification Berlin, the nature parks created at the former marshaling yard of Südgelände and at the abandoned airport of Johannisthal, were actually meant to compensate for the loss of nature that was caused by two major urban development projects.

Other limitations arose from the clash between practices and discourses of the biotope protection regime with those of other nature regimes. Notably, traditional forms of shaping green spaces according to horticultural aesthetics or for promoting the recreation of citizens remained deeply entrenched in the practice of administering and managing public space. Thus, the actual spatial design of the aforementioned nature parks was the result of painstaking negotiations between promoters of concerns for biotope protection with garden architects who wanted to "put nature on stage" through horticultural design.[36]

Finally, the regime was not free from internal tensions and dilemmas. Although ecologists claimed that biotopes should be protected to allow citizens to enjoy direct contact with nature, and although activists drew on ecological categories and arguments to defend open spaces in their neighborhood, in the day-to-day practice of planning these often turned out to be conflicting goals. Thus planning ideas for the Südgelände-park show a constant move away from a biotope-protection policy that would have massively restricted public access to the area. Eventually, a pathway system was constructed that allowed visitors to stroll through the area. Similar conflicts became apparent when management measures meant moving or eradicating abundant plants and thereby clashed with activists' framing of the site as unregulated "urban wilderness."

Figure 9.2

Tree-pit plantation in Berlin. Photo by Jens Lachmund.

sanctuary's growing gull and mongoose populations were also aggressively culled to lessen their predation pressure on nests.[87] Langley's bold management interference produced rapid results in the form of a steady and sustained recovery in wader and water bird breeding populations at Rondevlei, including the reestablishment of its renowned heronry in 1981, a quarter century after its disappearance.[88]

The hippopotami also provided Langley with a powerful argument for not only maintaining, but also expanding the sanctuary. By the mid-1980s the hippo grazing crisis had become acute, and Langley warned of an impending "tragedy": the re-extinction of hippo "after returning ... to an area where they had been extinct for over 200 years and where there [*sic*] presence is essential for the well-being of the aquatic environment."[89] This was a result, he declared, of the "unfortunate mistake" made in 1950 of placing "too much emphasis ... on preserving the vlei itself" and not enough on the "terrestrial environment of the area" even though the two were "closely interrelated ... and one cannot be adequately conserved without the other."[90] As a result, the sanctuary was"of insufficient size to be ecologically viable," and to enhance its viability Langley was allowed annex more than one hundred hectares of public land adjoining the reserve, which had been earmarked for schooling, as grazing land for his hippo, nearly doubling it in size.[91]

Conclusion

Fortress conservation was reinvented at Rondevlei in the final two decades of apartheid in response to the unique urban pressures faced by the sanctuary-cum-reserve. Its location on the Cape Flats exposed it to aggressive invasion by both exotic vegetation and poor blacks, the former the legacy of environmental engineering by foresters and the latter of the social engineering by apartheid urban planners. By the mid-1970s these twin assaults had destroyed Rondevlei as a bird sanctuary and the credibility of the fortress conservation approach of its first warden, Ernest Middlemiss. Faced with the complete failure of conventional conservation, Rondevlei's second warden, Howard Langley, used its "large open air laboratory" to experiment with a new approach that substituted alliance-building for force to win rather than compel popular consent to the reserve. Langley's eclectic and innovative fusion of scientific ecology and pragmatic futurism redefined Rondevlei's purpose away from "birds" to "nature" and from elite recreation to popular education. By broadening his remit and winning popular consent for this expanded mandate, Langley was able to aggressively enlarge the boundaries of the reserve in the late 1980s, thereby successfully enclosing land earmarked for black education and housing as hippo grazing.

The importance of Rondevlei as the laboratory for the invention of a new kind of urban conservation is confirmed both by Langley's subsequent meteoric rise within the local state to head of Cape Nature in 2001 and by the generalization of his approach to massively expand the city's reserve system post-1994.[92] Langley's reintroduction of hippo to Rondevlei, in particular, powerfully demonstrated that the urban environmental clock could be successfully wound back from five past midnight to precolonial dawn and that by doing so conservationists could successfully claim back scarce urban land from the city's burgeoning poor black population. The consent of the latter to their continued dispossession could in turn be secured through their employment and "environmental education" in the enlarged reserves.

Notes

1. Carruthers 1995; Foster 2008.

2. See, for example, Foster (2008, pp. 144–177) for Johannesburg and van Sittert (2003) for Cape Town.

3. See Berkes (2004) for theory on community-based conservation; Cock and Fig (2000) and Ramutsindela (2004) for its practice in Southern Africa; and Graham and Ernstson (2012) and Graham (2015) for its use in Cape Town.

4. Grove 1996.

5. Union of South Africa 1913.

6. Union of South Africa 1913, tables 5 and 15; 1950, tables 3a and 12.

7. Rosenthal 1980, pp. 4–8.

8. See, for example, Middlemiss (1946).

9. Ibid.; Middlemiss 1974, pp. 4–6.

10. The words of those of the director of the South African Museum, Louis Peringuey, cited in Bolus (1918, p. 66).

11. Cape of Good Hope (1899, pp. 644–645) and Wild Bird Protection Act (1899, No. 42).

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11 Ecology in the Urban Century: Power, Place, and the Abstraction of Nature

James Evans

Humans are now an urbanized species, with over half of the global population living in cities—a proportion forecast by the United Nations to rise to 75 percent by 2050. At the same time, the Intergovernmental Panel on Climate Change has claimed with 95 percent certainty that climate change is being driven by human activities, prompting scientists to herald the advent of the Anthropocene, a new era in which humans have become the main drivers of environmental change. The challenge of securing a sustainable global future has become a question of taming the environmental impacts of cities. Within this context, ecology has emerged as a technology of governance, promising a way to manage human relations with nature in more sustainable ways. As in the nineteenth century, when crusading sanitarians and engineers tamed death and disease with modern infrastructures supplying water and energy, so in the current urban century, urban ecology is being herlded as being capable of arresting environmental destruction with closed loop systems and adaptive management. Ecology is the scientific assumption lying behind every rhetorical "eco" preface, providing a compass to navigate safe passage to the promised land of sustainability.

The irony of this redemptive role is that ecology originated as a discipline not primarily concerned with people. Environmental historians have offered compelling accounts of how concepts like *succession* and *ecosystems* embody the specific characteristics of the rural and wilderness areas in which early ecologists worked.[1] Sometimes the parallels are literal: the idea of "pioneer" plant communities was derived from research conducted on the vast plains of the Midwest in early twentieth-century America, across which human pioneers had moved barely a century earlier. One particularly stubborn consequence of this has been the hardwiring of cultural preferences for "wild" environments into the scientific models of ecology itself, which tend to value equilibrium systems.[2] When we come to human-dominated systems this has made life difficult. Urbanization results in extremely disturbed systems, where the creative destruction wrought by capitalism in the form of constant development and redevelopment creates an inherently dynamic landscape. In ecological terms cities make little sense, they fit none of the models, and tend to be cast (traditionally at least) as a form of "anti-life."[3]

Until the 1990s the ecological study of cities was largely confined to a handful of German ecologists trapped on the urban island of West Berlin and to the coffee table publications of a few curious naturalists. The Rio Earth Conference in 1992 changed this dramatically, prompting ecologists to call for a "new ecological paradigm" that places humans within ecosystems rather than separate from them.[4] In this era of urbanization,[5] applying systems ecology to cities to develop technologies of ecological governance holds great appeal as it suggests that they are coherent, knowable, and manageable entities.[6] The prize of managing urban ecosystems more sustainably is substantial: cities consume 70 percent of natural resources and produce 80 percent or carbon emissions. They are home to a growing majority of the world's inhabitants and must increasingly adapt to the consequences of a changing climate. No longer simply a curiosity, urban ecology is supposed to facilitate low carbon transitions and help city dwellers adapt to rising temperatures and increasingly extreme weather events. As if that weren't enough, its proponents highlight significant physical and mental health benefits and property price uplift that accrue from proximity to nature.

Urban ecology has gone from subdisciplinary backwater to hot topic, viewed as a key disciplinary ingredient in the quest for sustainability. But perhaps more than any other science, ecology reflects the places in which it is practiced. This chapter explores how urban ecology dovetails with the rise of ecological governance and the suite of ecological planning and policy tools like ecosystem services, green infrastructure, and resilience that accompany it. These highly mobile global policy discourses increasingly frame debates over urban futures, but are characterized by a series of tensions that hamper their application. This chapter critically examines these tools and the forms of urban ecological research through which they are practised and produced. It identifies a gap between the discursive power of urban ecological governance and the relatively modest transformations wrought in cities on the ground and discusses some of the implications of this gap.

Baltimore project team to understand how the urban mosaic functions at the scale of the city. This point is picked up in Pickett and colleagues' review of urban ecological systems,[30] which argues that urban ecological planning tends to be based on principles and cases rather than data and an understanding of processes. The problem identified is that the former approaches struggle to manage the kinds of "novel ecological circumstances" that cities will experience under a rapidly changing climate. This argument is reminiscent of debates from the first half of the twentieth century over the ability of ecology to generate scientifically valid knowledge about causal processes, given its field-based methods and emphasis on the identification of patterns.[31]

The Baltimore project uses computer modeling to understand how different variables affect one another in the city, and seeks to abstract from the specificities of Baltimore through the idea of *syndromes*, or commonly occurring sets of urban environmental characteristics that have predictable functions. The inference is that cities will then be susceptible to standardized management interventions. In capturing general sets of traits rather than a specific set of rules about function, the notion of syndromes owes more than a passing resemblance to Elinor Ostrom's diagnostic approach to Common Pool Resource Management (perhaps no coincidence as Ostrom worked with resilience scholars in her later career).[32] Within this conceptual framework the diagnosis of "symptoms" enables corrective management. The danger of viewing cities as sick patients, though, is that it reproduces the idea that urban nature is a degraded form of "real" nature, echoing the pathologies of the city—like crime and pollution—identified by the writers of sociological urban ecology in the 1970s. Of course that movement lacked any real empirical or explanatory basis, unlike the large-scale and long-term urban ecology research programs occurring in places like Baltimore, which collect large amounts of data to enable a process-based approach.

As an experimental site Baltimore has become emblematic of a specific brand of urban ecology that seeks to meet the demand for data-driven technologies of conservation to underpin sustainable urban management. That said, how generalizable the findings about urban resilience from Baltimore are remains an "open question for now."[33] Baltimore's modern history of deindustrialisation seems quite extreme, compared for example to Stockholm or an East Asian city. At a deeper level, the kind of complex adaptive systems that inform resilience thinking purports to be general and universal, and yet enrolls researchers into the specific systems that they study. In Baltimore the city is transformed from the object into the subject of research; it is a system or laboratory that is simultaneously altered by research as it is conducted.[34] Within this context there is no distance between scientific work and its practical application—a situation that empowers ecologists, Geographical Information System scientists, and environmental scientists not only to engage with but also to stand in for urban planners and policymakers who are traditionally responsible for managing the city. Seen in this light, ecological research is both an applied mission to transform nature in place and an attempt to discern and abstract a set of universally replicable rules and knowledge for use elsewhere. The next section considers these dynamics.

Place, Power, and the Abstraction of Nature

In Baltimore's Watershed 263 ecologists have directly shaped urban nature, building the indicators, designating the sites, defining what counts as desirable nature, and most importantly, installing it in the urban landscape. Ecology intervenes as a form of delegated power provided by the avoidance (or impossibility) of positive action from traditional urban actors. But while the Gwynn Falls study demonstrates the power of ecological perspectives to shape the urban landscape, it simultaneously highlights the inability of ecological science and policy tools to address the pressing social and spatial rifts that characterize contemporary cities. What does monitoring of nutrient loading and urban resilience have to say about massive unemployment? It would be difficult to imagine a scenario in which someone watches David Simon's television series *The Wire*, set amid the poverty and corruption of West Baltimore, and concludes: "You know what Baltimore could really use? A multimillion-dollar investment in monitoring, research and experimentation with nutrient loading in its urban streams and wastewater system."[35] In this way, such research shares much with other technocratic urban governing techniques, ranging from sustainable development projects to so-called Smart Cities, which are disconnected from everyday life and the wider political and economic structures that shape it.

This disconnect matters on the ground as ecological tools empower some actors and disempower others.[36] Green infrastructure has been promoted by and is enacted largely by landscape architects, planners, and conservationists through a managerial approach. Putting ecosystem services into practice requires different skill sets, ones that empower economists, social scientists, and psychologists to discern financial values from quantitative and qualitative datasets and favoring policymakers and planners with the ability to understand and interpret these kinds of knowledge. Resilience and socio-ecological systems privilege the ecologist, albeit one who can link socio-ecological flows to financial and economic imperatives.[37] Within the technocracy of ecological governance each policy tool empowers subtly distinct groups of actors and types of knowledge. Just as the emergence of the sanitarian city in the nineteenth century required a new cadre of urban planners, engineers, and public health experts, so the shift from the sanitarian to the sustainable city involves a renegotiation of professional roles. The danger of this is that it displaces local voices and actors from the arena of urban transformation.

The adoption of conceptual frames like resilience reflects a desire to lend extra scientific credibility to urban governance, but gives rise to an exertion of power without any formal power being attributed. As any practising urban ecologist will attest, ecologists and their interventions play only a very modest role in directly transforming the cities in which they work. The greater effects of their work are to reproduce global discourses of urban ecological governance and the promise of systematic and generalizable knowledge through scientific knowledge production. Ecologists must first *extract* knowledge from cities through intensive, long-term field studies, if they are to subsequently *abstract* it as a generalized body of urban ecological knowledge to sustain the universal approaches of ecological governance. It is precisely the impossibility of ever collecting perfectly representative data and the prohibitive costs of collecting comprehensive data for every city that necessitate the abstraction of general principles for urban governance. Baltimore is the place in which ecologists are trying to explain the trademark functions of urban ecology, translating field studies into generalizable principles of the kind that can underpin the scientific management of the sustainable city.

The inherent tension between ecology as a field science reliant upon particular places and its urge to establish principles explains the slippage when specific approaches are rolled out as general fixes. For example, Stephanie Pincetl's critique of the million-tree initiative to plant large numbers of trees in several major US cities suggests that the ecological services provided by different species in different places vary hugely and are poorly understood. A type of tree that sequesters carbon in the midwestern climate of Chicago may do nothing in Los Angeles.[38] The assumed ecological benefits from widely regarded “good policies,” like simply planting lots of trees, are largely a matter of faith. Resilience represents a discursive ecological policy tool, which frames systemic approaches within a model of how society functions. As an umbrella goal for cities and regions it is hard to argue with, but what it means on the ground as a governance tool at the local level is less clear. Its success in penetrating national and international policy networks stands in contrast to the difficulties of implementing it as a meaningful basis for decision-making in local and regional contexts.[39]

Of course the tendency of environmental discourse to trade in global claims, which assume singular conceptions of citizenship and place, is not new. Talking about the emergence of global climate science in the 1990s, Jasanoff and Wynne argue that its establishment involved “not only the international coordination of assessment and policies but also the difficult task of harmonization at the cognitive level.”[40] By “cognitive harmonization” they mean the processes by which ways of defining, conceptualizing, and measuring objects of research achieve general acceptance among scientists, funders, and policymakers. Environmentalism has evolved through a series of acceptances that goes something like this: global environment = global environmental problems = global environmental solutions, with each stage corresponding roughly to the 1960/1970s, 1980s/1990s, and 2000/2010s, respectively. The Future Earth program provides a recent example. Established in 2012 by the International Council for Science, an NGO based in Paris, this ten-year international research initiative aims to develop the knowledge for responding effectively to the risks and opportunities of global environmental change and to support the shift toward global sustainability. Mimicking the International Panel for Climate Change, its goal is to mobilize thousands of scientists from around the world to establish a coherent platform from which to engage high-level policymakers and other stakeholders “to provide sustainability options and solutions in the wake of Rio+20 [the United Nations Conference on Sustainable Development, 2012].” Global environmental science since the turn of the millennium has created an industry in global solutions, of which Future Earth reflects a recent and extreme version. This cognitive harmonization is now extended to the management of cities as well. The rational and data-centric approach of this brand of urban ecology shares much with the technocentric discourse of Smart Cities, which increasingly holds sway as the solution to urban sustainability challenges, especially in the context of the construction of new cities in the Far East. In the urban century the boundaries between the urban and the environmental solution industries are becoming increasingly blurred.

Pressure from policymakers to simply "make it work" highlights the disjuncture between abstracted global discourse of urban nature and the embedded and messy realities of ecological research underpinning them. This deficit of scientific understanding is of course cast as a solvable problem, discussed in terms reminiscent of the arguments put forward by climate modelers in the 1990s whereby more money to do more research that will collect more data to produce better models will fix the problem. Ecological governance here runs aground on a familiar shore: the inherent specificity of environmental processes in different places at different times. What is interesting, and it formed the starting point for this chapter, is the way in which urban ecological approaches have spread so rapidly, becoming entrenched in mainstream global discourse (and funding priorities) in spite of their inherent difficulties.

Conclusions: (Dis)Placing Ecology

Almost without anyone noticing, urban ecology has become a foundational ingredient of governance in the Anthropocene. Dovetailing neatly with other technocentric approaches like Smart Cities, technologies of ecological governance are increasingly promoted as approaches to urban management. The appetite of policymakers, funding bodies, and planners for ecologically informed decision-making tools has grown in tandem with the emergence of an increasingly influential set of research institutes and NGO networks that promote different approaches around the world. The growing rhetoric of global solutions finds expression in an increasingly complex mixture of approaches on the ground, nourished by a growing reliance on long-term and large-scale scientific research. There is clearly value in understanding the processes and practices of knowledge generation and translation that underpin urban ecological governance. For example, how do

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12 Refiguring the Rural: Eco-urbanization in Yixing City

Jia-Ching Chen

> The difficulty of balancing land use and ecological security is great. The intensity of land use in Yixing is very high and ecological environmental protection is already extremely urgent.…The optimization of land use structure requires the closure and relocation of Taihu shoreline towns and a considerable number of enterprises and villages, which will transform farmers' traditional cultivation customs. This will be done.
>
> —Yixing Bureau of Land and Resources, *Yixing Land Use Master Plan (2006–2020)*

> Yixing's Qiting subdistrict has a rainbow-shaped bridge called Tangtian Bridge. Next to the bridge is a completely new residential development called Dongjiao Gardens. The people call it "the evicted households' new paradise."
>
> —"Yixing Dongjiao Huayuan's Qiaodong Residents' Committee and Relocated Households' New Paradise"

Perched on upended cinder blocks at the entrance to the Dongjiao Gardens relocation settlement, the Zhao brothers greet me from their usual spot on the edge of the entry drive near the complex perimeter wall. Twenty feet behind the septuagenarians, a teal Kobelco backhoe shovels in an oscillating pirouette, removing the dark earth hillock from beneath itself.[1] Beyond the excavator, the widening shoulders of Qingyuan Boulevard unfold behind crews of migrant workers, a level line for the flattening horizon of state-planned green development. Across Qingyuan, the shovels have filled a paddy with rubble from Tangtian village, and the itinerant workers have pitched green canvas tents there against the weather. Told from this uneasy vantage point, the story of the Zhao brothers' displacement from their natal village and resettlement at Dongjiao decodes the churning landscape of the countryside in Yixing, and across China.[2] Their story, and many like it, reveals processes of social and environmental transformation that are typically elided by the terms of "green development" and "eco-urbanization" under which economic growth in the region has been promoted. As this chapter will show, eco-urbanization in Yixing extends practices of rural dispossession and deepens patterns of urban-rural inequality by refiguring the rural as a necessary object of social and environmental transformation (see figure 12.1). It is my broader argument here that in facing its environmental crises, the Chinese party-state has sought to maintain local-level economic growth and competition while balancing agricultural land loss by constructing rural land as a national scale environmental resource.

One of the most striking features of China's state-planned green development is how it refigures rural space and rural society as backward and environmentally irrational at local and national scales. I offer the term "refigure" to refer to the party-state's making "the rural" into a concrete signifier of diverse social-environmental processes, constituting it as an object of governing and a site of transformation.[3] These processes of refiguring—of *re*-counting, molding, modeling, diagraming, personifying, rationalizing—include the multiple dimensions of ideology, planning practice, culture, and landscape change that shape the "norms and forms" of green development.[4] In this chapter, refiguring refers concretely to party-state calculative practices, spatial planning, physical landscape change, and the cultural politics of agrarian transformation. Urban nature is here imbricated with the rural in material and symbolic ways. This is evident in the physical construction of the "eco-city," as farmland is converted into sites for housing and the industrial production of green technologies, including photovoltaic (PV) solar panels for global markets (see figure 12.2). Yet, it must be said that the rural is not simply subsumed by the urban. Rather, the rural is forcibly divided from rural society—previously understood as people inhered to natal places of production and reproduction—and is refigured as a space of national environmental governance.[5] In this, I argue that this emergent figuration of the rural is the sine qua non of the party-state's imaginary of national development as a spatially planned and coordinated project at the scale of the entire national territory.

How is it that such a model of green development by dispossession has gained dominance during a time when there is increasing public and party-state concern over rural land dispossession?[6] In order to examine the construction of green development ideology and its forms of environmental

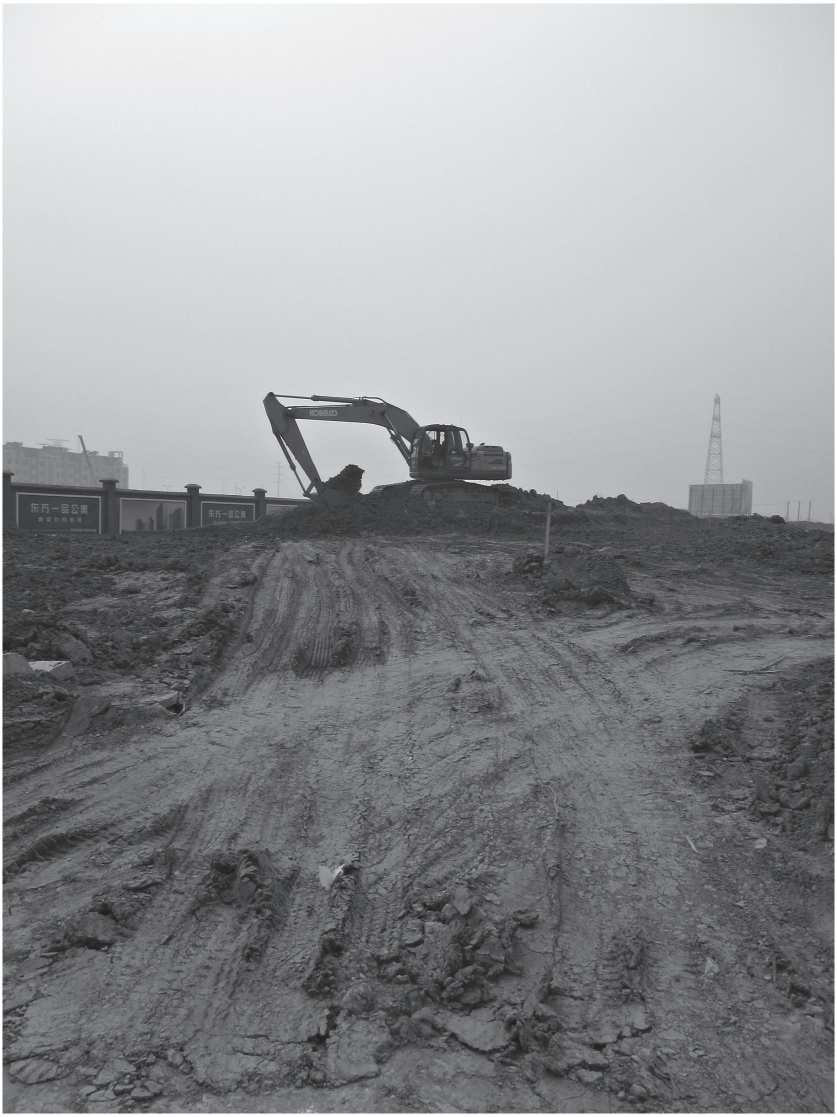
东方一品公寓
菁英们的选择
KOBELCO
东方一品公寓

Figure 12.1

The entrance to Dongjiao Gardens, the demolition resettlement housing development for the Zhao brothers and over 15,000 new neighbors occupying 5,380 units. Photo by Jia-Ching Chen, 2011.

land is conceived as a resource to be managed according to two regulatory axes. First, its use and purpose must abide by a nationwide quantification and rationalization of "total land supply" for development (*gongdi zongliang*). Second, rural land is seen as an explicitly environmental resource to be protected and efficiently used.[16]

In the present conjuncture of planned rural transformation and eco-urbanization, the category of farmland (*gengdi*) is critical to both of these regulatory axes. Although the state's environmental valuation of rural land includes place-specific uses such as wildlife habitat and ecological preservation, such "ecological services" are also conceived as attributes that can *and should* be planned under centralized authority. It is this state designation of rural land as fundamentally an environmental resource that produces tensions between ecological preservation, the historical emphasis on maximizing grain production, and the current dominance of land development as a source of local government revenue.[17] This makes rural land a sociospatial Möbius strip: both inside and outside, the figure and the ground, it is topologically a single-boundary object with multiple contradictory dimensions. The making of rural land resources into a calculable economic and environmental object allows it to be mutually intelligible between historically rival logics of socialist productivism and ecological protection, while simultaneously maintaining divergent meanings within each.[18] The intensity of the contradictions contained within it is evidenced by the political justification given to dispossession as necessary for environmental governance and for urban-industrial modernization.

The land regulation regime has been critiqued as riddled with opportunities for arbitrage and institutional failures that are due directly to the dual system of state and collective land ownership.[19] However, this prevalent interpretation implies a one-dimensional hierarchical relationship with the central state, which is "gamed" or "negotiated" by local authorities. In my analysis, the central policy development of "ecological targets" and their implementation at the local level are productive of social-environmental relations in refigured "rural" and "urban" spaces.[20] I argue that the local implementation of such policies through a quota allocation system works to make abstracted quantities—and not the enumerated things themselves—the substantive objects of central governance. Paradoxically, in order to preserve its environmentalized value, rural land in any particular locale is governed as a fungible quantity, divided from its place-specific ecological attributes and “preserved” as an arithmetic constituent of a net sum. Conceptualized by the party-state as an exchangeable resource, rural land can be instilled with different functionalist attributes that are themselves equally divisible and locatable as objects. Thus, environmental resources and services (such as those associated with a wetland) are themselves not taken as intrinsic to any particular locale, but as discrete forms of designated, designed, and built environments.[21] In short, rural land is stripped of its previous social-environmental relations, and fundamental categories of rural sociality—farmers, agrarian production, and villages—are refigured in the process. The following section describes villagers’ experience of this process of refiguring the rural—of dividing people, as a biopolitical problem of population, from the land as an environmental problem of resource governance.

Refiguring Villagers through Dispossession

In 2008, the Zhaos were evicted from their natal Fenzhuang village, three kilometers to the northeast of Dongjiao Gardens. Until that time, they had lived through five decades of rural production regimes from collectivization to the Household Responsibility System on through to the present privatized leasehold system. In the previous twenty years, the bachelors had depended largely on subsistence agriculture and occasional daywork for their livelihoods. Since eviction, they also received supplementary income from contract farming lease payments on the remaining village farmland and small payments from the expanded rural pension system since 2009. For two years after their eviction from Fenzhuang, they rented temporary housing in a village just beyond the maw of Qingyuan’s eastward extension to Taihu Lake. At the time I first interviewed them, in April 2011, they had been resettled in Dongjiao Gardens for about eight months. Despite the official narrative of the “Dongjiao paradise” described in this chapter’s epigraph, the Zhaos and their neighbors experienced years of uncertainty and insecurity as a result of their displacement. “We still aren’t used to this place,” the elder Zhao Ge commented. “What is there to be accustomed to? This place will never be complete.” Raising his chin to the backhoe, Zhao Di finished his statement with an “ahh” that mixed a tone of resignation with a hint of the interrogative. They explained this experience of dislocation in two ways.

First, their resettlement had been fraught with delays, broken promises, and financial difficulties. Although regulations stipulate that resettlement housing for people displaced as a result of land expropriation should be completed before eviction occurs, this has yet to happen in Yixing's eco-urbanization. Rather, the dispossessed receive a cash payment for "transition expenses" (*guodu fei*) such as moving and rent costs. Like most in Yixing, the Zhaos' lump sum payouts were calculated on an eighteen-month transition period and payment for an additional six months of delay were not settled until they moved into Dongjiao. Moreover, the ¥450 (US$65) per month that the Zhaos received would not cover a typical one-hundred-square-meter rental in the area, which averaged ¥500 (US$72) per month by 2009 and ¥650 (US$94) by the end of 2010.[22] Once they received ownership of their apartments, there were further costs as the units were delivered as bare concrete boxes with no finishes. These shortfalls and increased living costs for electricity, cooking fuel, water, and food meant that during the entire period of "transition," the Zhaos had to spend their savings and take up piecework "greening" the roadside landscaping in the Zone for ¥50 (US$7.2) per day.[23] The point here is not merely to convey that the Zhaos and their fellow evictees met hardships and exploitive conditions. Rather, the objective is to show how these conditions are features of Yixing's model eco-urbanization. For many villagers, the compensation scheme has served to enclose and circulate their cash savings, originally intended for retirement and emergencies, as a form of land and real estate development finance.

This leads to the second aspect of the Zhaos' experience of "incompleteness": the literal unmaking of their social-environmental world in the transformation of the rural landscape. Zhao Di's remarks referred not only to the under-constructed environs of Dongjiao Gardens, but to the larger eco-city project and the encompassing special economic zone. While they had been evicted over two years prior, their land had yet to be requisitioned for development. In fact, the Zhaos and their neighbors frequently returned to their former village. Bicycling for an hour, they went back to the site of Fenzhuang once or twice a week to tend the vegetable gardens they still depended on for subsistence. In the evening, they would bring a small harvest back, intended to last the days until they returned. The brothers complained that their vegetables were not as they had been before their eviction. "They don't taste good, they're yellow and they rot quickly." They partially attributed this degradation of their food to intermittent care, but emphasized changes to the soil and water resulting from the demolition of the village and ongoing construction projects. Regardless, the imminent "completion" of post-dispossession transition will leave no access to farmland, and the Zhaos and other ex-villagers still dependent on subsistence activities will almost inevitably be left in a much worse position. In my surveys, evictees without access to gardens or cropland reported that weekly food expenses increased by over ¥70 (US$10) per person.

Different resettlement processes and temporary housing situations led to very uneven access to village plots. Furthermore, the quality of plots after village demolition also varied widely. For example, I met other former residents of Fenzhuang who did not experience crop damage. Others reported that the demolition workers were stealing their vegetables. For their part, workers told me that they only took food from gardens that they tended themselves in plots that they observed were abandoned. Through discussions with evicted residents and observation of villages undergoing demolition, I found that such effects were unevenly distributed as the direct results of constantly shifting changes in the village landscape. Citing how cadres and some families benefited from the process of village eviction and demolition, the Zhaos and other villagers were clear in identifying these evolving landscapes as manifestations of a process of development that was socially uneven and politically determined. For example, the processes of eviction, demolition, compensation, and resettlement are not uniform across all household cases. In anticipation of eviction, some families were allowed to establish separate householder registrations for younger family members who were not technically eligible. This enabled each to collect transition and relocation compensation. Others secured permission to expand the area to their homes in order to maximize compensation. Cadres negotiated their compensation packages in advance. By the time the demolition and relocation company was dispatched to deliver notice and document property for compensation, many well-connected households had already signed their papers and received their settlements.

The timing of resettlement relative to eviction is also critical to the experience and long-term outcomes of individual households. With months of advanced mobility, some of these families actually profited directly from their neighbors and evictees from other villages by becoming landlords. These differences in experience have significant direct impacts on household-level outcomes in relation to the village landscape in that some

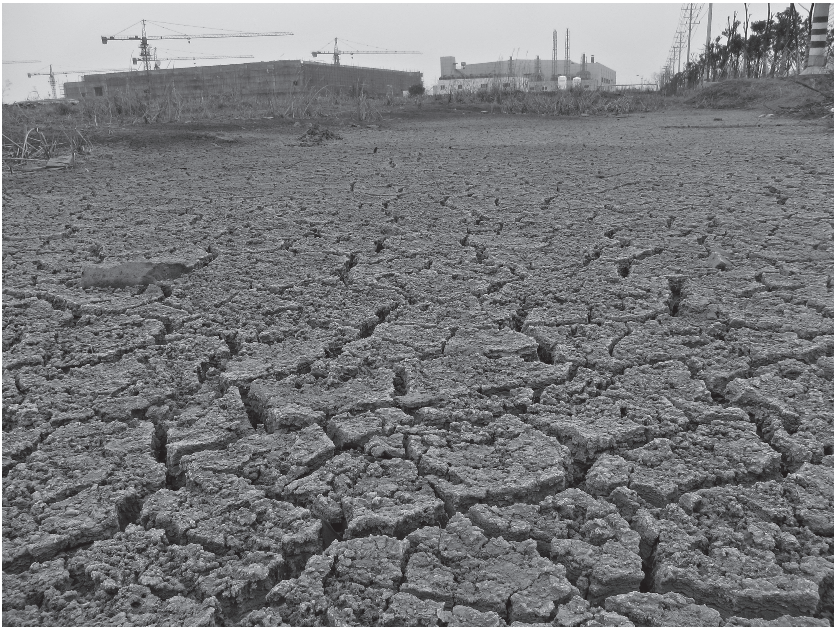

Figure 12.5
Fallowed "prime farmland." Infrastructure construction frequently leads to prime farmland being cut off from irrigation and fallowed even before it is requisitioned for construction projects. The area is still held by the village collective and is classified as "prime farmland," as it has not been converted to another use. Photo by Jia-Ching Chen, 2011.

Within the Jiangsu provincial context, Yixing has the lowest per capita level of farmland at 0.031 hectares per person compared to a provincial average of 0.064.[35] Yet, Yixing is the main site for the maintenance of prime farmland quota in the western Taihu basin. The Wuxi Prefectural Bureau of Land and Resources calls Yixing the "primary battleground" for the protection of prime farmland and for the construction of replacement farmland, emphasizing that the location of prime farmland should be maintained, its quantity should not be diminished, and its quality should be raised.[36] These points all reflect basic policy on farmland protection at the national level. However, by integrating projects to improve agricultural land quality and efficiency of land use, eco-city planning efforts have aimed to justify village land dispossession and the conversion of prime farmland.

In order to skirt the policies on prime farmland protection, the Zone has created projects for constructing "high-standard prime farmland." Developed with engineered soils, the newly produced farmland is designated as equivalent to prime farmland and can therefore be used to justify the "relocation" and "consolidation" of actual prime farmland, which is strictly protected from conversion to other uses.[37] Sun Dian, the director of the Wuxi bureau's agricultural land planning and protection department, states that the construction of such high-standard farmland is aimed at intensifying production and generating economies of scale. He further emphasizes the notion that farmland should be "consolidated."[38] Moreover, Sun's discourse on land use efficiency and productivity links arable land to the health and prosperity of future generations and the problem of "grain security" (*liangshi anquan*).

However, rural land consolidation is primarily driven by the imperative of development. The timelines of urbanization and private enterprise development demand predictable quota allocation and farmland replacement. Consolidation enables such smoothing by redesignating village-built spaces and marginal lands as replacement farmland, thereby yielding a "surplus" that exceeds assigned quota targets. In practice, this means that actual agricultural productivity becomes secondary to the availability of a plot of land for use in the production of quota surpluses. For example, Yixing's original high-standard prime farmland project was subsequently canceled when local government appointments shifted in 2012. While it has since been replaced with a project planned in conjunction with the Wuxi prefectural government, the temporal dislocation calls into question what is being "replaced" (*buchong*). In the operation of the quota regime as a centralized and national quantity, farmland is stripped of specific locational attributes apart from its jurisdiction. This means that features such as cropland productivity or irrigation are discounted. Stripped of its place-specific attributes (such as its history of cultivation, productivity, market or other infrastructures, and so on), land is reduced to a fungible quantity, and its now disembedded environmental value is recorded on paper for "circulation" through the quota system. However, this effort at creating a unified fungible quantity necessarily confronts the reality of the land itself. Even as such a system of state legibility *does* shape the landscape and material relationships, land as a commodity, as Polanyi asserts, is necessarily a "fictitious" one, as something not originally produced for exchange and whose complete value in social-environmental relationships cannot be captured by a fungible quantity.[39]

This provides us with a new perspective on green development. Yixing's process of eco-urbanization has relied upon an explicit "greening" of rural land that simultaneously upholds goals of agricultural production while denigrating smallholder production and livelihoods as environmentally inefficient. Rural land is refigured as a resource category, requiring active and direct state-led governance. As the producer of the largest share of Jiangsu provincial replacement farmland quota for years, Yixing is pivotal to the implementation of the national quota system and the ultimate accounting in the balance sheets of the central Ministry of Land and Resources. But the work of the local Yixing Bureau of Land and Resources (BLR) in balancing land use conversion requisitions, as well as in recording consolidation and replacement projects, is not limited to fulfilling its quota obligations. Rather, the Yixing BLR plays a much more active role in that it justifies, based on environmental policy, the consolidation of village land in one locale so that farmland elsewhere can be converted into other uses (see figure 12.4). This extends the local governmental role far beyond its implementation of central policy. It means that the work of municipalities in developing and administering the quota system for managing land supply defines the substantive basis of what the central land policy is actually governing.[40] This in turn allows us to understand how quotas for rural land use and farmland conversion enmesh land into an ecological game of net sums.

Observing the politics of land administration, both village residents and government officials readily identified how the work of the Yixing BLR plays two separate roles at the intersection of local jurisdictional and vertical ministerial agendas.[41] At the local level, the BLR accounts for land resources and quotas, facilitating project approval for land conversion. Under the centralized bureaucracy, the BLR ensures that replacement farmland quota obligations are met and that protected prime farmland is not converted to other uses. Rural residents frequently identify the failure of "regulation" of illegal farmland conversion as corruption. Villagers spoke daily about how a good deal of land churning is enabled by collusion between township, subdistrict, and village officials with local bureaus of the Ministry of Land and Resources (MLR), which frequently adapt implementation rules to the specific needs and conditions of local government development projects.

For leasing her household's farmland, the Yang family receives an annual ¥400 (US$58) from the Yixing government, and ¥250 (US$36) from the contract farmer. However, like many households in the region, they still produced primarily for subsistence and the cash does much less in the face of uncertainty and their rapidly increasing cost of living.

Zhang Ting, the contract farmer, leased paddy fields for wheat and rice from three villages totaling over eight hectares (roughly the holdings of sixty families). In 2010, her market price and contracted procurement price by the State Grain Reserve rose about 30 percent over the previous year with incentives for contract farming. Because of her economies of scale and the spike in prices, she earned 61 percent more per unit area compared to Mrs. Yang and her fellow villagers who harvested in 2008 to 2009. Such a difference cannot be attributed simply to the function of market mechanisms. Rather, the account above shows how the restructuring of grain production has taken place through extra-economic means of force, far outside the ambit of "the dull compulsion" of the market described by Marx.[53]

Retreading her two-year path through the decorative landscaping of flowerbeds and pregrown trees that fringe the rubble of her village, Mrs. Yang and I passed beneath a billboard that proclaimed: "New Talent, New Industry, a New City" (see figure 12.6). Mrs. Yang set a tattered plastic bag with a small trowel and a clipper on the edge of her vegetable patch. Beyond a mound of broken weeded bricks, she pointed and blinked her watering eyes at what appeared almost as a mirage: a bright green-yellow field of mature rice. "Mrs. Zhang will be coming to harvest very soon. She owns tractors and will bring five or six workers to finish it very quickly."

Conclusion: Toward a Grounded Political Ecology of the Global Green Economy

In 2010, prominent billboards featured the exact Kobelco tractors used by Beijing Construction and the local demolition and relocation company to reshape the Yixing countryside (see figure 12.7). The advertisement, also common throughout Shanghai and Beijing in 2010 and 2011, proclaimed, "A green future is deepest in my heart," alongside a picture of a child drawing an idealized natural landscape unfolding incongruously beneath a backhoe. Beyond, a city floats among clouds in a field of white space. The composition recalls traditional Chinese landscape painting, but inverts its

smallholder agriculture cannot compete effectively in global capitalist markets, to which they are nonetheless tied for inputs and sales, smallholder production with land privatization "would lead to rural poverty, unrest, and growing inequality, not agricultural efficiency and smooth urbanization."[61] In attempting to resolve this contradiction, the Chinese state is using a combination of dispossession and the creation of a social safety net for the rural residents who are faced with these rapid and radical changes. This safety net, including the minimum subsistence allowance (*dibao*) and the expanded rural pension championed by Wen Jiabao, helps to secure compliance with forceful dispossession. In this regard, the emerging figuration of the rural may harken early conditions of China's move to a post-socialist political economy and its rise as an environmental leviathan.

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Notes

1. Kobelco equipment, manufactured in joint venture factories in Sichuan and Hangzhou, is pervasive in demolition and construction sites across the country.

2. Names of people and some places have been modified.

3. I draw on Haraway's (1992) analytical approach to figuration.

4. Rabinow 1989, pp. 7–16.

5. Chen 2013b.

6. Land dispossession is the leading cause of social unrest, with tens of thousands of protests amounting to 65 percent of officially recorded "mass conflicts" each year (Yu 2005; He 2010; Chen 2013a, 2017).

7. See Chen (2017) for a discussion on the institutionalization of these practices.

8. Zhang 2002, p. 62.

9. The Zone was founded under the Yixing municipal authority in April 2006. It was promoted to provincial level status in July of the same year and was designated

drivers of such inter-jurisdictional transfers of "flying land," highlighting the issues of local government finance and political tenure.

34. The term for "prime farmland"—*jiben nongtian*—is also frequently translated as "basic farmland." In the MLR translation of the 1999 law, the term is rendered as "capital farmland."

35. Jiangsu People's Government 2009.

36. Wuxi Bureau of Land and Resources 2011. Although Yixing is a county-level unit within the Wuxi prefectural jurisdiction, the prefecture and county territories are not contiguous. This highlights the prevalent practice of inter-locality management of land quotas and farmland dynamic balance.

37. The general process of land use optimization is referred to as land organization (*tudi zhengli*). Land and land use consolidation (*jizhong*) refers to the assembly of land for zoned uses. Farmland reclamation (*fuken*) and remediation (*zhengzhi*) are frequently used to describe projects that consolidate village construction and marginal lands for the flexible accounting of quotas for farmland preservation, construction and conversion, and construction land use.

38. *Ba nonyongdi jizhong* (Wuxi Bureau of Land and Resources 2011).

39. Polanyi 2001 (1944).

40. Wang et al. (2010, 457) cite Jiangsu and Shanghai as the originators in the late 1990s of rural land consolidation practices, which enabled local governments to exceed allocated quotas for construction land. Although the Land Administration Law (National People's Congress 1998) includes broad provisions for converting farmland outside of approved master plans (see Article 58) and encourages rationalization for efficient village land use (see Article 41), these practices still require notification to the State Council. Wang and Bai (2011) cite a 2006 pilot provision by the MLR to allow intra-jurisdiction rural land consolidation to be "transferred" to offset urban demand for construction land quota in Jiangsu, Shandong, Tianjin, Hubei, and Sichuan. This pilot program was extended to the rest of the country in 2008 (Ministry of Land and Resources 2008b; for futher details, see Cai 2014).

41. China's bureaucratic matrix is organized around vertical central government ministries known as "strips" (*tiao*, e.g., the Ministry for Ecology and Environment, the Ministry of Natural Resources, and so on) and horizontal territorial jurisdictions known as "blocks" (*kuai*, e.g., provinces and cities). Theoretically, provincial and local level bureaus report to their respective ministerial hierarchies, while territorial blocks are administered by the people's government of that jurisdiction. Ministry bureaus do not have binding authority over the regional governments within corresponding hierarchical levels. Local governments must also conform to the policies of larger subsuming governments. For instance, Yixing, a county-level city, falls under the jurisdiction of the Wuxi prefecture-level municipality, which is under

Jiangsu province. Local units, such as Yixing's government and its separate SEZs, operate with a great deal of autonomy in pursuing various results-oriented policy goals ranging from GDP growth to farmland preservation.

42. *Shang you zhengce, xia you duice.*

43. Min 2008b; Liu 2010.

44. Wuxi Municipal Party Committee 2009.

45. Interview with Yixing Economic Development Zone Director of Investment and Industrial Planning, Bureau of Foreign Investment, May 21, 2010; from author's fieldwork archives, interview: 20100521.YXZ.1.

46. Through 2012, the three successive phases of the Guodian projects brought over ¥12 billion (US$1.8 billion) of investment to the Zone. The combined manufacturing capacity of the Guodian projects reached 800 megawatts of PV cells and modules in 2012, an increase of 60 percent over 2011, which brought the Zone's total manufacturing capacity to over 3 gigawatts—about 10 percent of the 2012 national total.

47. These physical aspects are frequently conflated under the concepts of ecocity construction in China. A prominent example here is the Shanghai 2010 World Exposition slogan: "Better City, Better Life." There are also distinct cultural terms associated with greening such as "ecological civilization" (*shengtai wenming*) and "ecological living" (*shengtai shenghuo*). These ideas are highly aestheticized and are used to refer to cultural values of environmental consciousness as well as to an improved quality of life.

48. According to the *Yixing Land Use Master Plan (2006–2020)*, the total land area in Yixing in 2005 was 217,742.82 hectares, of which 55 percent was classified as agricultural land. Of 30,831.90 hectares of construction land, nearly 60 percent was held by village collectives, 32 percent was in townships, and less than 8 percent was classified as urban land under the direct planning authority of the municipal government. The plan has the goal of reducing village construction land by half by 2020 (Yixing Bureau of Land and Resources 2010).

49. Interview with Yixing Subdistrict Bureau of Land and Resources Staff, November 11, 2010; from author's fieldwork archives, Interview: 20101111.YBLR.1.

50. *Quanmin canyu chuangjian shengtai shi.*

51. At the peak of solar PV industry expansion in 2010–2012, there were six major cell and module manufacturers operating in the Yixing Zone, including a national state grid enterprise, Guodian, and global top-ten producers Trina and RenaSola. There were also several local state-backed incubator projects.

52. The project name plays on the use of the character for "new" (*xin*) in joining "creation and innovation" (*chuangxin*) to "new city" (*xin cheng*).

53. This often-cited passage comes from the discussion of "so-called primitive accumulation" in *Capital*, volume 1. Marx (1906 [1867], p. 809) describes the process in direct relationship to the social construction of the working class: "The organization of the capitalist process of production, once fully developed, breaks down all resistance. . . . The dull compulsion of economic relations completes the subjection of the laborer to the capitalist. Direct force, outside economic conditions, is of course still used, but only exceptionally. In the ordinary run of things, the laborer can be left to the 'natural laws of production,' i.e., to his dependence on capital, a dependence springing from, and guaranteed in perpetuity by, the conditions of production themselves."

54. Tuan 1977, p. 57.

55. For a decade now, experts and boosters have been pointing to China's combined economic power and political system as the largest—and perhaps most important—venue for the development of "a clean energy future" (Friedman 2010a; Finamore 2011). See Friedman (2010b) for one of many sanguine references to China's "green leap forward."

56. National manufacturing capacities estimated by Earth Policy Institute (http://www.earth-policy.org/data_center/C26) and Bloomberg (http://www.bloomberg.com/news/2013-09-08/chinese-zombies-emerging-after-years-of-solar-subsidies.htm). A one-gigawatt-capacity thermal power plant would provide electricity to over 700,000 US homes.

57. Analysis by GTM Research, a source of expert analysis on renewables markets, reported by Forbes (http://www.forbes.com/sites/uciliawang/2012/10/16/report-180-solar-panel-makers-will-disappear-by-2015/).

58. In 2018, the United States followed suit and imposed a 30 percent tariff.

59. International Trade Administration 2012.

60. Harvey 2003.

61. Day 2008, p. 56.

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public together, not because they had an established stake in the matter, but to form a "competency group." The group collectively and transparently elaborated on *ways of knowing* flooding and its many social, environmental, and historical factors with the aim of "redistribut[ing] expertise across the 'scientific'/'vernacular' divide."[1] This put the onus not on *what* is known, but *how* something is known. The grounding and worlding approach of this book would be an important companion in such efforts to contextualize, not discard, scientific ways of knowing.

Another important move forward is to ask not only for in-depth case studies from one city or physical location, which was how we conceived this book project as a first necessary step to gain textured accounts, but to more explicitly design studies that develop comparative "productive geographies," exploring how urban natures are local yet connected to other locations (see also chapter 1 in this volume).[2] Urban scholars have been busy in developing these comparative geographies, including, for instance, studies of "translocal" forms of urban struggles that have followed Slum-Dwellers International, an alliance of marginalized neighborhoods across Asian, African, and Latin American cities;[3] "mobile urbanism" that studies how urban policies, standards, and expertise move and are translated across the world to influence local dynamics;[4] and comparisons across the global South and North of processes that marginalize people from potable water access in Indian and Californian cities.[5] Such comparative work does not seek to find the same variables or factors applicable everywhere, but looks for surprises and possibilities in how differences are played out, and how such differences could be used for theorizing.

Another challenge is how to integrate more-than-human approaches that seek to decenter the anthropocentric perspectives that lie at the heart of most urban and environmental studies. In the humanities and critical social sciences there has been an upswing of thinking that (urban) animals have narrative capacities that can help to open up, rather than pinning down, the anthropocentric view of cities that structures policy and politics.[6] However, while such approaches attend to quite easily identifiable nonhuman subjects, what also seems necessary is to account for wider forms of bio-agency. This could follow how Joshua Lewis approaches the complex coastal ecosystems in Louisiana, where he shows us precisely how humanmade infrastructures, which have been implemented over the course of 150 years, have created a historical-biophysical complex that carries more-than-human agencies beyond simple “nonhumans” and as such shape politics in unpredictable and difficult ways.[7]

Finally—and we will return to this point below—to publish a book today on *grounding urban natures*, which contains studies from across most continents, means to face Western bias in constructive ways. Urban environmental studies, from scientific ecology to critical and poststructuralist geography and on to environmental history, are informed by specific habits of thinking history, city, and nature. We need to draw on postcolonial and decolonial scholarship to develop methods and collaborations to counter such habits and further multiply the ways through which urban natures are understood.

We now continue this chapter by taking our cues from the chapters to suggest a set of heuristics toward a repertoire for comparative urban environmental studies. Our aim is not to articulate a theoretical framework but rather to suggest a scaffold that can support study and collaboration. This aim is connected to William Cronon’s edited volume *Uncommon Ground*, which inspired our work with this volume, in which chapters and authors represented a family of attempts that could not easily have been placed under a single rubric or theory but that still made a lot of work for establishing a new ground for critical environmental studies. Our volume also rests on a family of attempts, diverse and inspiring, that aims to explicitly pluralize and rethink urban nature from multiple locations, as well as offering methods and intellectual tools that can be useful in doing so.[8]

Act of Grounding: Articulating, Texturizing, Retrosembling, and Situating

The volume is, overall, an effort to *view urban natures as multiple* through the lenses of *grounding* and *worlding*. These two main heuristics form part of our treatment of comparative environmental urbanism in chapter 1 and they reverberate throughout the book’s chapters. While grounding directs attention to how urban nature is reworked in particular places and becomes diverse through situated understandings, worlding tries to capture how places and urban natures are never only local. Instead, through the actions of experts, bureaucrats, activists, and scientists—and animals, vermin, and seeds—together with broader processes such as colonization, land dispossession, and world trade, urban natures are indeed connected from place to place. However, rather than using the meta-frame of globalization, we draw upon how anthropologists, geographers, and historians have tried to address how localities become part of the world, each in its own particular and specific way.[9] On both sides of our analytical effort—the side of the *local* through grounding and on the side of the *extra-local* in worlding—we foreground texture and particularity with the aim of creating a theoretical transaction space for dialogue and contestation wherein the local is not domesticated within the global.

The *act of grounding* translates the unity of "urban nature" as a universal object of science or a backdrop for exploitation, capitalist or otherwise, into multiple social, political, and biophysical relations.[10] Grounding, in this sense, brings material to critique and problematize the simplification of urban nature through taxonomic or ecological scientific frameworks, that is, resisting the idea that urban nature is a stable knowledge object, a thing that can be studied with the same (universal) framework wherever you go. Grounding, on the contrary, goes into the midst of social struggles over how to use, abuse, cohabit, change, understand, and contest urban nature. By tracing or uncovering urban nature through *relations*, urban nature can become pluralized and socialized and include the agency of nonhumans and the vibrancy of matter.[11] What does urban nature mean in different places? How is urban nature composed, contested, and known? What does a given array of social arrangements in-and-through urban natures tell us about the city in question, its people, country, region, and place in the world?

This stance is resonant with how "place" has been thought within relational thinking in human geography. Rather than taking an essentialist approach, we follow Doreen Massey in viewing place as a relational and historical phenomenon, brought about through associated multiple understandings that different social groups might have.[12] This relational and dynamic view, which is akin to what Torsten Hägerstrand termed the "processual landscape" (*förloppslandskapet*), foregrounds a process-driven way to understand the entanglements by which human and nonhumans come together.[13] It also resonates with what Neil Smith called "the production of nature" and what Sverker Sörlin and Paul Warde have referred to as "environing."[14]

At the core of all these efforts, including our own in this volume, lies an urge to differentiate through critical historical and social scientific methods the seemingly basic backdrop categories of "nature," "ecology,"

Across these interlinked tactics, the act of grounding, consequently, translates urban nature from a simplistic or singular entity—the "urban nature" *qua* "green space" standard—into an open-ended, multifaceted, and plural idea and materiality that is a vibrant, inseparable, constantly changing element of a fluid and extended urbanity. Apart from discovering and unpacking urban natures, and speaking to and about them from various locations, this book has tried to provide examples of how different scholars have responded to the challenge of grounding. They have thus generated multiple historically and geographically specific configurations of urban nature and also demonstrated various methods of how to accomplish this. Situating, articulating, texturizing, and retrosembling are in this respect individually helpful and mutually reinforcing methods for providing historically and empirically valid presentations of the increasingly important "natural" dimensions of the urban.

Act of Worlding: Locatable Practices of Translation

Having proposed an act of grounding, from within and below, we now turn to the act of *worlding*. As an analytical alternative to "globalization" or "the planetary," world*ing* is viewed as those ongoing, continually negotiated, and locatable practices by which thought, things, and places become part of a wider world.[31] For AbdouMaliq Simone it provides a lens to explore the practices through which urban residents access and participate in a "larger world."[32] Similarly, for Ananya Roy and Ahiwa Ong, it represents the "practices that creatively imagine and shape alternative social visions and configurations—i.e. 'worlds'—that are wider than what already exists in a given context."[33] Importantly, for them, the study of the practices of worlding by actors ranging from elites to subalterns invites a mid-range theorizing that "dives below high abstraction to hover over actual human projects and goals unfolding in myriad circumstances of possibility and contingency."[34] For our approach, the worlding of urban natures is about focusing on situated practices that strive to rework socioenvironmental relations in particular places, while at the same time viewing these practices as connected in tangible ways to practices elsewhere.

It is crucial for the understanding of the current phase of urbanization that we see worlding as an empirical—that is, a historical—phenomenon in its own right. Urbanization will not adapt to proclaimed policy or theory, nor will it emulate or imitate previous phases; urbanization will first of all

42. Wittgenstein 2001 [1953].

43. Sörlin 2012; Heise, Christensen, and Niemann 2017.

44. Heise 2008; McKibben 2010; Morton 2013.

45. Brenner and Schmid 2012; Arboleda 2016.

46. Leitner and Sheppard 2016; Peake 2015.

47. Moore 2014, quotation from second paragraph.

48. Ernstson and Swyngedouw 2019.

49. See Roy (2014, p. 13), as well as Robinson and Roy (2015, p. 182) on "global urbanisms."

50. von Thünen 1826.

51. Césaire 2010 [1956].

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evolutionary history of hominids (our history) dates back 28 million years (and that of primates about 75 million years), scorpions' evolutionary history dates back 425–450 million years.[33] From an evolutionary perspective, they have been quite conservative morphologically, while highly adaptive in their behavior, physiology, and ecology, which explains their ability to thrive in extreme physical conditions. As biologist Gary Polis writes:

> Some [scorpion] species can be supercooled below the freezing point for several weeks and yet return to normal levels of activity within a few hours. Other species can survive total immersion under water for as long as one to two days. Desert species can withstand temperatures several degrees higher than most other desert arthropods are able to tolerate.[34]

That scorpions can live in cities demonstrates such adaptive capabilities, but it also highlights our advance into their ecological niches. From the Spanish conquest to the end of the sixteenth century, the city of Córdoba expanded into the Suquía River, which was the natural habitat of scorpions (and other species).[35]

When it comes to feeding, scorpions use their sting to capture prey. They hunt at night, and although they have vision, vibrations from their prey guide their hunting while they orient and sense with their whole body. Scorpions do not sting unless provoked or if they feel threatened. Interestingly, our very condition as diurnal human animals has made it difficult to study scorpion ecology. It was not until 1954 when the use of ultraviolet light became common in field research that their nocturnal habits could be documented and studied (see figure 5.2).[36]

Given what we have learned, the idea of cohabiting with *Tityus trivittatus* might be discarded automatically because they are potentially deadly for humans. On the other hand, have they not already adapted to our cities? Are we not constantly expanding our habitats and displacing them and pushing them to adapt to a wide variety of artificial systems? Their adaptability and evolutionary history indicate that they are likely to continue to adapt to extremes. Combating them with noxious pesticides might be effective in the short term but ecologically devastating in the long term. Taking the human-scorpion situation of this essay as an example of the tensions involved in cohabitation, we now turn to our alternative design that attempts to acknowledge human and scorpion needs at several trophic levels.

evolutionary history of hominids (our history) dates back 28 million years (and that of primates about 75 million years), scorpions' evolutionary history dates back 425–450 million years.[33] From an evolutionary perspective, they have been quite conservative morphologically, while highly adaptive in their behavior, physiology, and ecology, which explains their ability to thrive in extreme physical conditions. As biologist Gary Polis writes:

> Some [scorpion] species can be supercooled below the freezing point for several weeks and yet return to normal levels of activity within a few hours. Other species can survive total immersion under water for as long as one to two days. Desert species can withstand temperatures several degrees higher than most other desert arthropods are able to tolerate.[34]

That scorpions can live in cities demonstrates such adaptive capabilities, but it also highlights our advance into their ecological niches. From the Spanish conquest to the end of the sixteenth century, the city of Córdoba expanded into the Suquía River, which was the natural habitat of scorpions (and other species).[35]

When it comes to feeding, scorpions use their sting to capture prey. They hunt at night, and although they have vision, vibrations from their prey guide their hunting while they orient and sense with their whole body. Scorpions do not sting unless provoked or if they feel threatened. Interestingly, our very condition as diurnal human animals has made it difficult to study scorpion ecology. It was not until 1954 when the use of ultraviolet light became common in field research that their nocturnal habits could be documented and studied (see figure 5.2).[36]

Given what we have learned, the idea of cohabiting with *Tityus trivittatus* might be discarded automatically because they are potentially deadly for humans. On the other hand, have they not already adapted to our cities? Are we not constantly expanding our habitats and displacing them and pushing them to adapt to a wide variety of artificial systems? Their adaptability and evolutionary history indicate that they are likely to continue to adapt to extremes. Combating them with noxious pesticides might be effective in the short term but ecologically devastating in the long term. Taking the human-scorpion situation of this essay as an example of the tensions involved in cohabitation, we now turn to our alternative design that attempts to acknowledge human and scorpion needs at several trophic levels.

restoring the original forest that existed here, for giving the nilgai (Boselaphus tragocamelus) *and jackals an undivided landscape to roam, and for recreating a habitat for indigenous flora and fauna in a geologically dramatic setting. They would like Mangarbani to be integrated as part of a continuous biodiversity corridor in the Aravalli hills, stretching from Asola Wildlife Sanctuary in Delhi to Kot in Rajasthan. The campaign demands that the Haryana government not only comply with the Supreme Court and National Green Tribunal's orders but also take the initiative to protect the larger landscape of which Mangarbani is part. However, given the state government's complicity in shady real estate development deals, it seems unlikely that it will sort out and settle property rights in the area and make villagers partners in future conservation. Only continued pressure from the conservationists, working through the courts and media, may compel the government to protect Mangarbani.*

Although Mangarbani is in some ways a special case in being a sacred grove on the periphery of a modern metropolis, it highlights some significant processes at work in how urban India acquires or loses green spaces, as well as the political economy of land ownership and use. It also delineates the social transformations through which the cultural meanings that inhere in green spaces are reconfigured. The Mangarbani forest came out of obscurity in the last decade because it was featured in a naturalist's handbook.[15] *The weekend visitors it attracted were wilderness lovers, affluent residents of Delhi and Gurgaon, many of whom became homeowners thanks to real estate development facilitated by the "political bureaucratic nexus" that took over village lands. Now that this process threatens Mangarbani, in an ironic twist, some beneficiaries of land commodification have turned "environmentalist," ranging themselves against the "builder Mafia" from whom they bought their luxury apartments and bungalows and seeking to protect a green space that is not only perceived to be ecologically valuable but also an enhancement of their quality of life. From a mutually advantageous relationship with builders, sections of the elite have shifted their allegiance to a new axis, aligning with the older generation of Mangar villagers.*

Thus, even as the corporate identity and power of the village is broken down into individual fragments that hasten the commodification of land, another collective group constitutes itself as the guardian of the forest. The environmentalists do not replace the villagers, nor are they in conflict with them. In fact, it would seem that by talking to villagers about the

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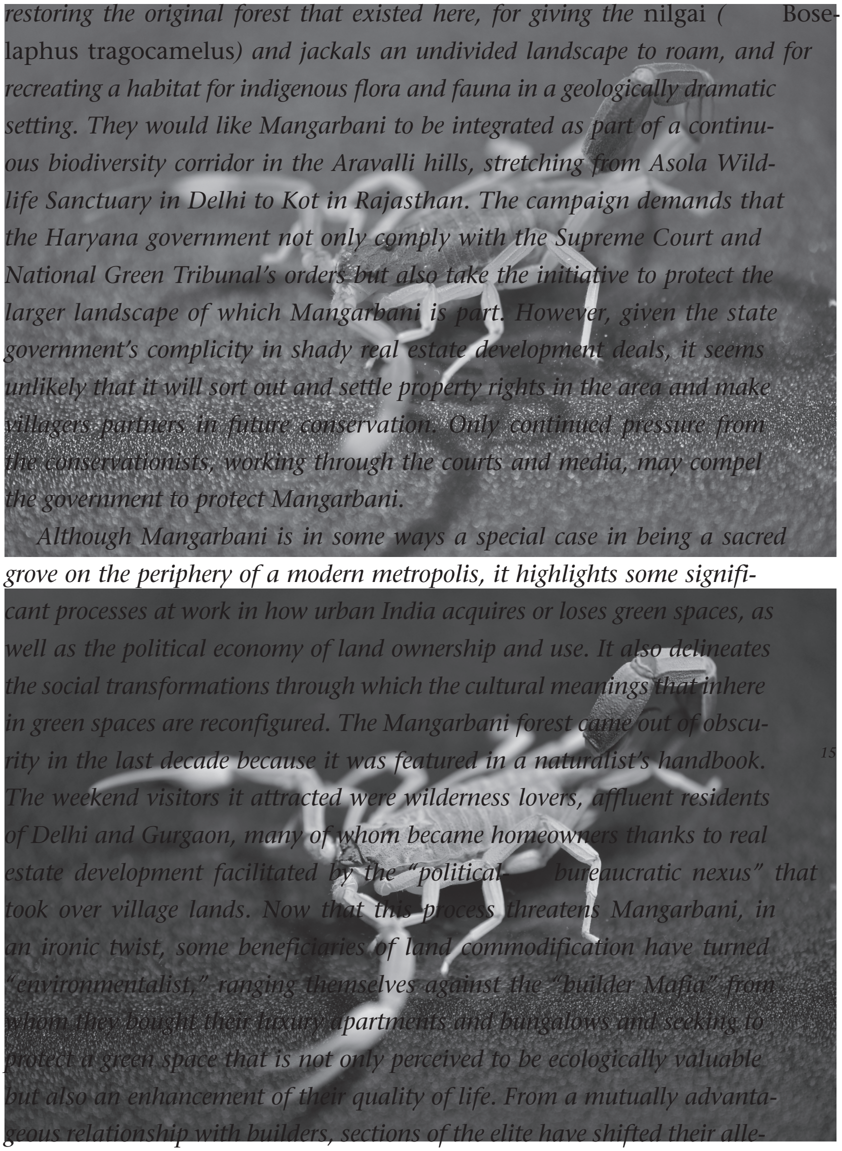

Figure 5.2

Tityus trivittatus in normal daylight (*top*) and with UV light (*bottom*). Photos by Martín Ávila.

Degradable Urbanism: An Alternative Design for a Shower Grate

The following describes our proposal for an alternative shower grate that intervenes in the present situation to speculate on cohabitation. It works in three main ways, which will be elaborated on below: to capture scorpions coming too close to human homes, seeking to change destructive human behavior that destroys habitats for creatures in the sewage, while biodegrading to feed the ecosystem below with nutrients. We first describe its functions and then compare it with present grates.

The photos in figure 5.3 are placed in the order of how the device would be used (see figures 5.3a, 5.3b, 5.3c, and 5.3d). The grate is internally covered with organic material such as bone meal (figure 5.3c). This attracts cockroaches, which, upon entering, get stuck in the adhesive that covers the upper and lower surfaces of the trap. The trapped cockroach sends out vibrations that would attract foraging scorpions that remain too close to the grate. If the scorpion enters the grate, it gets stuck on the same adhesive. In protecting the human home, the design recognizes that scorpions are hunters that do not eat dead insects or animals but are attracted by vibrations from prey.

However, while killing individual scorpions and cockroaches, the grate also operates to nurture and sustain the ecosystem below through altering metabolic and collective dimensions around the grate. When humans use the shower, the water flow will slowly degrade a white mineral layer on the grate’s upper and visible side. Successive showers gradually reveal a darker layer underneath, which is made of a clayish mineral compound that becomes increasingly visible (compare figure 5.3a with figure 5.3b). The incremental darkening is a way for the grate to signal decay and transformation, and to warn humans of increasing “exposure,” getting in closer and closer connection with the sewer. Thus, in contrast to the fixed metal grate between the “underworld” and us, this device operates to expose the sewer. It makes apparent the need to maintain the system with the intent of transforming our relationship to the “underworld” of sewage. Indeed, while *protecting* humans from dangerous individual scorpions, it also *attracts* humans to interact with the grate to sustain and intensify the relationship of affect and fear between the human home and the underworld of sewage.

In practice, once the orifices of a grate are almost completely dark (visually signaling “connection” to the sewer), it needs to be replaced (see figure 5.3d). This would happen every three to four months if the shower is used regularly. The user could discard the grate, compost it or directly mix it with soil, or just throw it in the garbage bin. Because the grate's materials continue to degrade, it is up to the person discarding it whether it will contribute directly to some metabolic cycle nearby or not. Either way, the nutrients that have accumulated from the insects and arthropods caught on the sticky surface will ultimately contribute to some biophysical process. Meanwhile, during its useful cycle (when operating as a grate), the device complements natural processes by releasing nontoxic organic and inorganic materials and can thereby also increase the sense of connection *with* rather than division *from* those places and systems that we do not see.

Comparing current models of fixed grates with our proposed degradable grate, we note certain differences. The fixed grate expresses an ideology of strict separation between the sanitized home and an underworld that is to be kept at bay. Through it go water and other waste, never to be thought about again. Our alternative grate is less a separator than a "mediator" in Bruno Latour's sense of the word in that it transforms, translates, distorts, and modifies meaning, and, we might add, material relations.[37] It connects the human home and the habitat of others, and translates both into a new (co)habitat, a shared and wider ecosystem. The grate's appearance furthermore signals that it is in a constant state of change and disintegration, reminding us humans that we take part in and relate to other worlds that we might know little about, but that at times intersect with our world. Our grate thus differs from current conventional grates in terms of how it creates and changes relations at different scales and in the way that it changes metabolic cycles. In this sense, the proposal is normative. It seeks to produce a change in behavior in people, to compel the user to participate in a new constellation of relationships that certainly demand more than those relations upheld by a fixed grate. Indeed, users need to make a concerted effort to use the alternative grate for their own benefit, and the benefit of others. It implies a shift in lifestyle and provokes a change in perception of who or what we are living with.

More generally, the alternative grate demonstrates a design approach in contrast from standard anthropocentric practices. Although it aims to benefit humans, the starting and the end point is the condition of the wider ecosystems. Our focus is not only the well-being of individual humans, but also on the way in which the artifact (and the humans engaging with it) may participate in the life (and death) of others, so that the livability

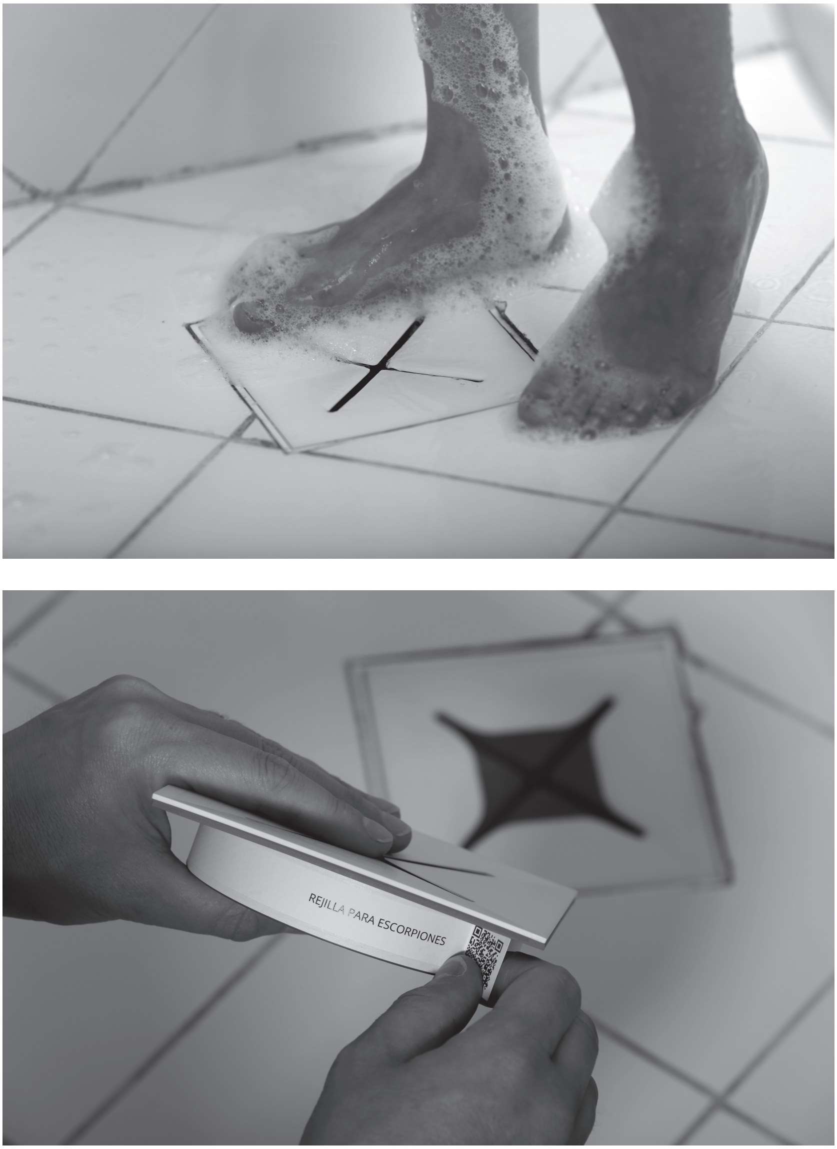

Figure 5.3
(a) Grate while showering (*top*). (b) Opening the protective strip to install a fresh grate and replace the degraded grate (*bottom*). (c) The grate is fitted with a trap for scorpions and cockroaches (*top right*). (d) Taking away the degraded grate (*bottom right*). Photos by Martín Ávila.

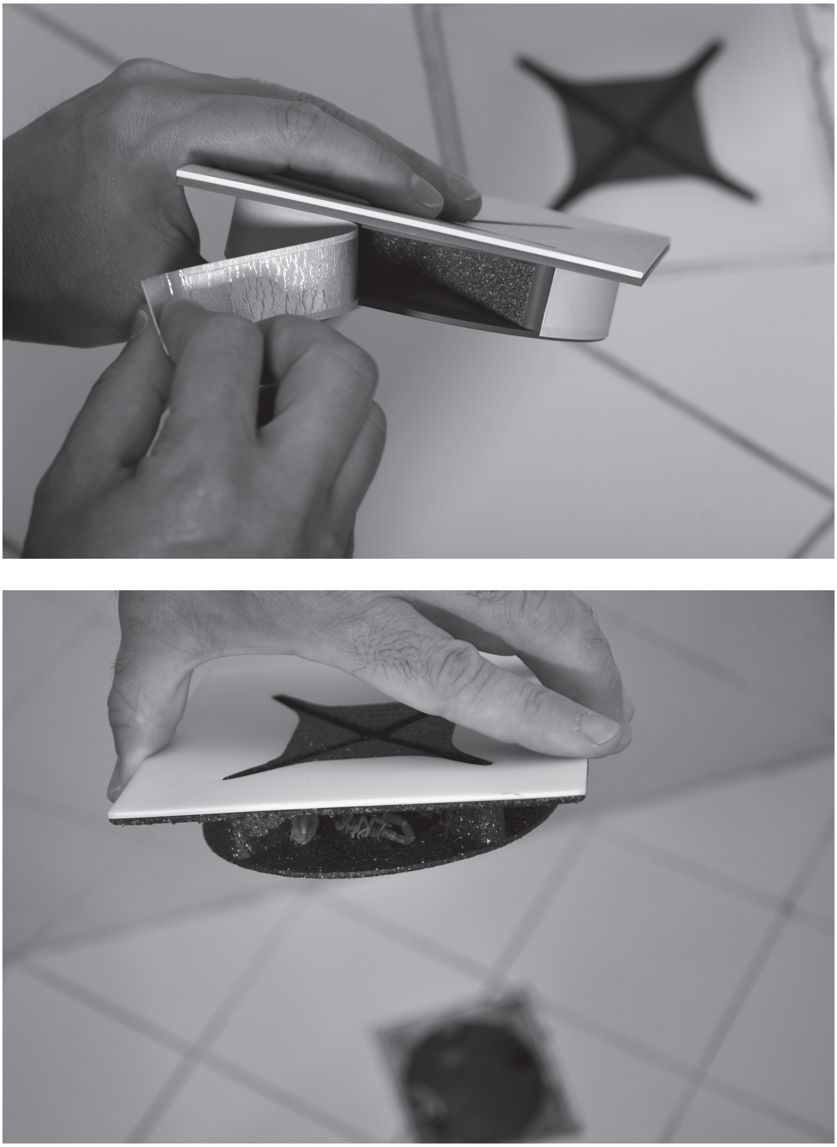

Figure 5.3
(continued)

or vibrancy of the shared cohabitation or ecosystem can be sustained. The alternative design translates this commitment in metabolic terms through its property of being scalable to the whole city. If mass produced, the alternative design would be a basic, simple thing to buy and use. If it were to become popular and installed in thousands, maybe tens of thousands of homes across the city, these thousands of devices, replaced every third or fourth month, would degrade and erode and start shaping the metabolic system at the city scale.[38] Importantly, the design operates beyond the individual human-scorpion encounter in regulating what material components enters the biosphere.[39] It challenges conventional design that does not think with wider ecosystems and more-than-human ecologies. And it provokes thinking about what other designs could be replaced with alternatives that aim to affect the way we engage with beings that we do not normally consider part of our everyday lives.

Discussion

We recognize the playful dimension of our speculative approach. It is also highly situated because the alternative grate design really only makes sense in Córdoba. Therein lies our commitment to grounding urban natures, a practice that seeks situated responses, practices, and sensibilities. However, it is worth rounding off with a discussion of what this approach to intervene in the entanglement between different life forms could say about politics and the politics of urban ecologies.

Our work tries to respond to how the simultaneous artificiality and wildness of urban nature demand a different way of thinking and practicing politics. Our cities, layered with attempts at modernizing and regularizing city life and city folk—and with a great variance across the world—hold in common the creation of quite fantastic ecologies, what some British geographers have eloquently phrased as the “dense comings and goings of urban life,” a quickly shape-shifting “recombinant ecology.”[40] Cities are unique high-energy environments, with a bundle of unpredictable inputs and fluxes of seeds, animals, and organic matters that are brought together in novel constellations with concrete and clay, with roads, cars, and electronic equipments. This makes for a strange place, and novel encounters are bound to happen. How are we as humans to organize our politics together with such wider, more-than-human communities with which we share the city?

The answer we are developing here attempts to stay localized and sustain dimensions of cohabitation that involve, among others, uneasiness, curiosity, fear, and fascination. Before developing this notion further, we can first contrast it with more mainstream natural scientific approaches that likewise deal with other life forms, in particular biodiversity and urban ecosystem services approaches. During the last decades, such work to change planning and human behavior to safeguard other life forms—often translated into policy tools such as habitat maps, biodiversity networks, or tables with contingency costs and trade-offs—typically reenact a separation of nature from culture.[41] They designate value to other life forms from within a Western and anthropocentric epistemological viewpoint.[42] While expressing care for other life forms, these ways of seeing and registering the nonhuman, risk continuing to mark a line between "nature" and "culture," between "them" and "us," just as the fixed conventional grate did. Here we have tried to move beyond, but also to complement, scientific registers—to make possible, perhaps—a richer, more affective connection between species. In short, to expand a multispecies sensorium of engagement and encounter. We can discuss this in three broader ways.

Affective Urban Ecologies

Mainstream approaches risk erasing or silencing vital dimensions of the ecologies that make up our habitat and worlds. By complementing centralized strategies and develop localized tactics, we have created a situated device that aims to integrate affective more-than-human ecologies as part of everyday urban life.[43] This means, on one hand, and as mentioned already, that the alternative grate in Córdoba would make little sense elsewhere—for instance in Texas, where snakes are the menace, or in Cape Town, where baboons cause problems. However, the practice that we have developed here to think design with (rather scary) nonhumans could still travel and be used to create other alternative designs in other places.

Our proposed grate aims to enact affective ecologies in several ways. To start with, the darkening surface of the grate shows what is normally imperceptible—namely, the degradation and flow of materials from a building. As such it belongs more to the paradigm of food than to that of household fixtures or appliances. It thus helps us to perceive the material flows that are disseminated to the environment and to sense the scale at which other artifacts degrade and how they influence our habitats. This direct relationship contributes to the possibility of increasing awareness of how the chemicals of hygiene products, cleaning products, and other products used at home influence the environments we inhabit by being disposed off into the sewers.

At a time when ecological crises expose the shortsightedness of various modes of human development, paradigms of design need to be disrupted through, for example, a redesign of everyday artifacts so that human exposure to other vital realms and species increases. The result would be a greater understanding of the complex ecological interplay in which humans are involved, including relationships that seem undesirable. In the process, we might also reach a more mature stage of reflection in producing the artificial, so that (design) proposals will consider the life cycles of products in relation to multiple beings.

This type of design practice also facilitates environmental education and participation. Instead of a centralized effort, such as a campaign in schools or workplaces about scorpions, educating becomes the province of nonhuman artifacts, in our case the biodegradable grate. This in turn implies that, as with any design, one would need to follow up on how the grate has been used to understand the different kinds of interactions, learnings, and changes it has, or has not, made possible.

Our proposal could thus be seen as part of recent efforts to reevaluate humanity's place "in nature." These range from scientific versions of Earth System Stewardship, or Gaia, with their associated global-legal regulations and imperatives, to posthumanist interventions to give voice to nonhumans, and further to decolonial thought, for instance through *Pachamama*, the term used by Andean pre-Hispanic cultures to designate human responsibility to all life forms. To various degrees, our mode of design can participate in discussions around efforts to materialize indigenous, postcolonial, feminist, and anticapitalist cosmologies that seek to reconfigure ways to be in the world.[44]

However, it is important to note that our *device* still *divides* and organizes an "above" and "below."[45] It does not try to arrange some kind of flat ontology where all is collaboration and bliss. Rather, it stays with the trouble and tension and actually tries to maintain a separation, an outside to its own relationality.[46] Thus, the grate is not a source of food for all cockroaches, but a trap for some of them and their predators, the scorpions. This can at first glance be viewed as a problematic example of cohabitation because organisms are killed, which is not the case with the fine mesh wire recommended by city officials in Córdoba. However, while the official mesh is structured around (total) safety, our design stays with the tensions of cohabitation as it seeks to participate in rearranging more fundamentally humanity's place in nature. The routine action to replace the grate after it has disseminated its nutrients, after it has become darker and we feel exposed, brings our human collective life closer to the trouble by nurturing the species that threatens us while preventing the possibility of human death (by single individuals of this species of scorpions). The grate thus forms an explicit part of the metabolic flow of the city and operates as what could be called a *biosemiotic threshold*.[47] More plainly put, the alternative grate engages humans and relates them to what is under their feet, creating a connection rather than a disconnection and thereby making us sensitive to ecological interactions that have become invisible through current infrastructure. The device arranges *a higher degree of exposure* to worlds that we humans are not normally in contact with.

Realms of Exposure

Through the particularities of Córdoba, we have now learned about the divisions between the human domestic environment and the "underworld" of sewage. Our work through design has attempted to *expose this lack of contact* with basic processes that are vital to any ecological niche, including our own, which involves acts of killing (some) scorpions and cockroaches, while protecting and nurturing the collective of scorpions and other beings through the release of nutrients. This approach is consistent with Haraway's position that "asymmetrical" multispecies encounters[48] require more than caring and nurturing, but also, as we just noted, dying and killing:

> We are in a knot of species coshaping one another in layers of reciprocating complexity all the way down. Response and respect are possible only in those knots, with actual animals and people looking back at each other, sticky with all their muddled histories. Appreciation of the complexity is, of course, invited. But more is required too. Figuring what that more might be is the work of situated companion species. It is a question of cosmopolitics, of learning to be "polite" in responsible relation to always asymmetrical living and dying, and nurturing and killing.[49]

Our alternative design is a direct attempt at inserting a device into one of these many knots. As a mundane object, it actively participates at various scales along a natural-artificial continuum in the handling of feces, urine, and other forms of (human) pollution to increase response-ability, our human ability to respond to others.[50]

By mediating between different realms of exposure, our work attempts to expose ontological aspects of design (preferences, behavior, and beliefs that seem unconscious and taken for granted) with the intention of increasing our participation in processes that might be difficult but are necessary to negotiate and enhancing our awareness of the (inarticulate) interests of more-than-human collectives. This invites a last speculation on including nonhumans or other-than-humans when thinking politics.

More-than-Human Political Assemblies

The alternative grate device can be said to operate at two levels: a micro-politics, practiced at the singular domestic level and coded with intimate feelings of fear and tensions; and potentially a macro-politics, operating on a massive metabolic and mass educational scale if it installed in thousands of households. These politics are enacted through the maintenance that the device requires, maintenance that is intentionally inscribed into it and that pushes humans to be part of something seemingly other (the life of sewage systems and scorpions, the areas where our bodily effluent is ultimately disposed of). The expiration date makes impossible the strict separation between spheres of dwellings.

These two levels of politics, while important, hide a deeper question of what politics means in a categorically more-than-human world. This question centers on exploring, in Aylon Cohen's words, "the boundary of the political community … between logical animals (humans) and phonic animals (nonhumans),"[51] and then considering whether our device can affect who or what has a voice in matters of common concern.

Following recent developments of Jacques Rancière's thought, for instance, we could understand the scorpion as participating in "more-than-human political moments" as it breaks out of anonymity and disrupts the sanitized ordered home.[52] While Rancière has argued that political agency cannot be extended to nonhumans,[53] his theory of politics as *aesthetics* (relating to perception by the senses) is nevertheless strictly nonanthropocentric and opens toward more-than-human interpretations of the political.[54] His assertion that a political subject is "an agent of the division of the [political community]" lends itself to understanding the scorpion in political terms. Indeed, politics proper for Rancière means breaking the normalized order of a policed space, one that allows only certain sounds and utterances to be sensed and translated into intelligible speech. If the alternative grate can assist in recognizing the new agent as a new "voice," then we could at least cautiously entertain the possibility that the device is participating in the making of more-than-human political assemblies. And, indeed, there are some indications that the grate could play this role through its own materiality.

It is the material design of the grate that produces accountability on part of humans to maintain the system. The materiality of the device also reformats the modern sanitized home so that the more-than-human "voice" of the underworld can be expressed, "heard," and sensed through the darkening of the (degrading) grate. If these conditions are not heeded, the grate will disappear and maybe the underworld will make itself heard again through a tragic and violent encounter with a scorpion in the bathroom. We here discover that at least part of the complex of living beings of the city's underworld can assert themselves as having, as it were, a palpable presence, which is one of the most basic principles of politics, the making-visible/sensible/hearable of new collectives.

Crucially, nonhuman beings' assertion of existing here among us (as an integral part of the city) bypasses the *representations* that we usually use to understand them (through, for example, scientific investigations, which take them as objects of nature, displayed as "habitat maps" or "ecosystem services," or by civic associations that want to protect wildlife and regard them as stakeholders in society). Rather, the device mediates between humans and the underworld of scorpions in such a way that scorpions' assertion of existing takes place through *their own modes of living*, not through representation by humans. The materiality of design, especially the view of a device as something that *arranges partitions*—that causes inclusions and exclusions in terms of perception, sensations, communications, and possible interactions—resonates strongly with Rancière's theory that political moments is about disrupting the "partition of the sensible."

If Rancière favors anarchistic rupture, liberal parliamentarian theory also provides speculative possibilities for our design approach. In Latour's elaboration of a "Parliament of Things," he writes: "The point … is that we don't assemble because we agree, look alike, feel good, are socially compatible or wish to fuse together, but because *we are brought by divisive matters* *of concern* into some neutral, isolated place in order to come to some sort of provisional makeshift (dis)agreement."[55] Perhaps our device could be a mediating artifact that could make possible more-than-human political deliberations. However, in contrast to Latour's rather expansive notion of a new Parliament, our speculation on scorpions in peoples' bathrooms has provided a much more intimate, everyday setting to think about more-than-human political assemblies and their constitution through the daily rhythm of life (and death) in the city.

Conclusion

This chapter started with an accidental encounter between a child and a scorpion in a bathroom. We used this situation to elaborate a design approach that opens toward a richer understanding of urban ecology and the natural-artificial continuum. Moving beyond traditional scientific approaches and descriptive social scientific research, we drew upon a speculative mode of research to explore urban ecologies yet to come, which the alternative shower grate materialized. As an artifact, this device invites human dwellers to stay with the tension of cohabitation, enrich their affective connections, and support wider metabolic flows while possibly encouraging the making of new more-than-human political assemblies.

We believe that our design approach to ecology could intervene in the current grave situation of unsustainability. The artifacts that surrounds us, from mass-produced domestic products to high-tech devices and big infrastructure networks, compel us to constantly leave our traces on every part of the planet, disseminating novel chemical combinations that do not take into account any other being but humans, nor any other being's chemical or metabolic flow. Because these chemical combinations have come into use at such a quick pace, the biosphere is unable to process them, leaving new, unknown, and harmful dynamics affecting many species, including our own. Performing as a border, the grate we proposed mediates these passages *between* different worlds (of the "human-home" and the "scorpion-underworld"), and it does so through its material components, with the hope of contributing toward a thinking, sensing, and doing that is life-affirming. Politically, this mediating border, this device, could embody the responsibility and *response-ability* that come with the acknowledgment of our part in a more-than-human world under stress.

Acknowledgments

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Notes

1. "En el hospital, un nuevo ingreso por picadura de alacrán: El Hospital de Niños recibió este lunes un cuarto internado por escorpionismo. Todos estables," *Día a Día*, May 1, 2015, http://www.diaadia.com.ar/cordoba/en-el-hospital-un-nuevo-ingreso-por-picadura-de-alacran. For all internet sources in this chapter, the last access date was September 18, 2018.

2. Hinchliffe et al. 2005; Hinchliffe and Whatmore 2006.

3. van Dooren and Rose 2012, p. 5.

4. Cohen 2015.

5. We recognize that our account from inner-city Córdoba in Argentina is situated within a Western-planned city and with households mainly connected to centralized infrastructure networks. This needs to be acknowledged in comparative research.

6. Henrik Ernstson and Sverker Sörlin, "Toward Comparative Environmental Urbanism: The Discovery of Urban Natures in a 'World of Cities,'" chapter 1 in this volume.

7. Serres 2010, p. 3. See also Serres's *The Natural Contract* (1995). For a critique of Serres's (2010) treatment of waste as appropriation through pollution, see Reno (2014). Drawing on biosemiotics, Reno foregrounds the *signals* that animals send out through their scat/shit and views waste as "signs of life," rather than waste as "matter out of place," and thereby affirms a nonanthropocentric framework. Our work resonates with his emphasis of the "liveliness of waste" (ibid., p. 19). For more, see note 47 on bio-semiotics.

8. This includes “certain plants,” which at times “throw out little invisible jets of acid … and we all know that nothing grows in the frigid shadow of fir trees” (Serres 2010, p. 2).

9. Laporte (2002 [1978]) calls it the “history of shit.”

10. For a historical account of infrastructure-led sanitarian transformation of Western cities, see Melosi (2000).

11. For Laporte (2002 [1978]), urban sewage and water infrastructure are tightly bound up with the historical rise in Europe of the bourgeois class with its ideas of home, cleanliness, and morality.

12. In relation to sewage and waste, see Melosi (2000) and Karvonen (2011). For a contrasting context from Dakar, see Fredericks (2014).

13. Haraway 2008, p. 41. See also the early work from the 1930s on “Umwelt” by Estonian biologist Jakob von Uexküll (2010 [1934]).

14. The quotation is from Booth and Williams (2014, p. 183; emphasis added), with explicit reference to Stengers (2010).

15. See Maran and Kull (2014, p. 46), who explain that narrative description is inadequate for the description of ecological semiosis and communication between species: “There are no general purposes that non-human organisms follow, their intentions are local and they do not have the tools for temporal integration or meta-description. … A narrative description of ecological events is [thus] always metaphoric.” This could be one critical conversation to have with van Dooren and Rose’s (2012) approach to viewing animals as “narrative subjects.” For a foundation into Maran and Kull’s work, see von Uexküll (2010 [1934]).

16. See Ávila (2012) for several examples of how material designs set up different forms of communication (and symbiotic relations) between humans and other species.

17. We should clarify that the design proposal of the grate was not a commercial commission. Rather, the design was a material configuration and research element in helping to conceive human and other-than-human relations in alternative ways. As such, other socioecological and more-than-human situations had been studied before we choose this particular one with humans and scorpions.

18. As developed in Avila (2012).

19. As we develop in the last section, design can be seen as a device that arranges partitions and opens for an interesting conversation with Rancière’s (2010) theory of politics as aesthetics.

20. Varying from year to year, the average number of persons getting stung by scorpions may be around two or three cases per day during the summer, with less

during the winter months. The source for this type of site-specific information comes from interviews we did in Córdoba but can also be found in newspapers and public reports; see, for example, “Se registran 40 picaduras de alacranes por día en Córdoba,” *Cadena 3*, January 3, 2018, https://www.cadena3.com/noticias/sociedad/registran-picaduras-alacranes-por-dia-cordoba_110780.

21. See the e-forum Forotarantulas (http://www.forotarantulas.com/foro/index.php?topic=9659134.0) with links. See also “Una nena de 7 años murió tras ser picada por un alacrán en Córdoba,” *Infobae*, January 8, 2017, https://www.infobae.com/sociedad/2017/01/08/una-nena-de-7-anos-murio-tras-ser-picada-por-un-alacran-en-cordoba/.

22. In a similar way, Hinchliffe and Whatmore (2006) observe that “cities are inhabited with and against the grain of expert designs” (p. 124).

23. Haraway 2010, 2016.

24. Haraway 2008, p. 83.

25. These questions form part of a wider project entitled Symbiotic Tactics (2013–2016) carried out by the first author with several designs including the alternative grate on which this chapter is based. These designs resulted from collaborations with many professionals and are based on research developed at the Multidisciplinary Institute of Vegetal Biology and other research groups within the Argentinean Research Council (CONICET). The design proposal part of this chapter was elaborated by Martin Ávila and Leonardo López using the project working title “Doomestics.”

26. To view a video of the difference between private and public connections in Córdoba, see “Video inspeccion de conexión cloacal domiciliaria,” YouTube, August 15, 2011, https://www.youtube.com/watch?v=59a0lm4TGuU. Note that the video is not from the specific neighborhoods being discussed in the main text. What is clear from the video and other reports is that there is a marked difference between (older) public and (newer) private pipelines, with thicker sediment in the former. From a traditional environmental justice perspective, this could indicate increased risks in terms of which type of household (class, ethnicity, and so on) scorpions are most likely to enter and cause harm in. We have found no secondary material to support such an environmental justice analysis.

27. For government information on scorpions and how to capture them, see “Alacranes: Cómo capturarlos en forma segura,” http://prensa.cba.gov.ar/salud/alacranes-como-capturarlos-en-forma-segura/.

28. See Gastón Hernán Pepa, “Especies venenosas en Córdoba: ‘No tema pero tome precauciones,’” *Córdoba Times*, November 13, 2013, http://www.cordobatimes.com/sociales/2013/11/13/especies-venenosas-en-cordoba-no-tema-pero-tome-precauciones/.

29. For editorial reasons we cannot provide the reader with all visual information we have available. For a map of the areas most affected by scorpions in households, see

Natalia Lazzarini, "Alacranes: Más picaduras en el centro y sudeste de Córdoba," *Día a Día*, October 1, 2015, http://www.diaadia.com.ar/cordoba/alacranes-mas-picaduras-en-el-centro-y-sudeste-de-cordoba.

30. See, for example, "Temporada de Alacranes: Consejos para cuidarnos en el hogar," Punto Sanitario, http://puntosanitario.blogspot.com.ar/2014/12/temporada-de-alacranes-consejos-para.html.

31. Martín Ávila and Leonardo López designed the alternative grate.

32. The design experiments were carried out with scorpions of several species (*Urophonyus braquicentus*, *Tityus trivittatus*, *Bothriurus bonariensis*), but focusing on the most dangerous for a human being, *Tityus trivittatus*.

33. Polis 1990, p. 2.

34. Ibid., p. 3.

35. The city grew with colonization following a known pattern of Spanish conquistadores killing or forcing away indigenous peoples, including Comechingones, Sanavirones, and other groups. In 2016 the city's population was approximately 1.5 million people.

36. Polis 1990, p. 128.

37. Latour 2005b, p. 38.

38. Keep in mind that this metabolism is also shaped by many materials that lie outside the control of this device, including detergents, chemicals, cleaning implements, flooring and fixtures, and so on. These materials nonetheless participate by harming or benefiting some living systems at some ecosystemic level.

39. This aligns with Reno's (2014) biosemiotic analysis of waste, not as "matter out of place," but as "signs of life."

40. Hinchliffe and Whatmore (2006) quote G. Barker's (2000) notion of "recombinant ecology". For ecologists' treatment of species as urban adapters/avoiders, see the volume edited by Niemelä et al. (2011).

41. See Ernstson (2013) and Ernstson and Sörlin (2013) for studies of the politics of biodiversity mapping and ecosystem services in Cape Town. See Lachmund (2013) on the development of habitat maps in Berlin from the 1960s.

42. See Peder Anker's *Imperial Ecology* (2001) for the origins of ecology as a science that par excellance was developed to control environments and peoples across the British Empire. We also note that there are more bottom-up approaches to biodiversity; see, for example, Arturo Escobar's (1998) early call and useful problematization in the context of indigenous knowledge practices.

43. Compare with Hinchliffe and Whatmore's (2006) argument for a "politics of conviviality," but with more Deleuzian connotations. See Katherine Wolfe's (2006)

reading of how Rancière's notion of politics could communicate productively with Deleuze's idea of the "imperceptible" (in spite of Rancière's reservation of the political potential of Deleuze's philosophy).

44. See, for instance, de la Cadena (2015) and Haraway (2016), as well as Garuba (2012).

45. Note, however, that this is done by materializing an uncertainty principle, not knowing who or what is going to establish contact with the device. More generally the alternative grate is designed to degrade and disseminate organic and inorganic compounds with chemical compositions that are nontoxic to other life forms.

46. See Swyngedouw and Ernstson (2018) for an argument against flat ontologies that risk off-staging political agency.

47. Throughout this chapter, we find several affinities with biosemiotic studies. In relation to how the alternative design fuses semiotics and metabolic flows, biosemiotician Jesper Hoffmeyer (2008, p. 345) suggests what he calls "semiotic fitness," arguing that "the magnitude of the flow of energy and the semiotic controls guiding the utilization of that energy … have constituted the pivotal points in both the historical process of civilization, and in the evolution of life on earth." This provides reasons for why our alternative shower grate can be understood as a form of "attunement" (Ávila 2012), a biosemiotic technology that is useful as a "tool for semiotic activity of every sort," such as for communication between humans, nonhumans, and all their combinations (Hoffmeyer 2008, pp. 343–344). For an explanation of open thermodynamic systems as life processes, see Schneider and Sagan (2005).

48. Haraway 2008, p. 81.

49. Ibid., p. 42.

50. Haraway 2016.

51. Cohen 2015, p. 277.

52. Booth and Williams (2014, p. 45) analyzed Australian wild fires "breaking free of wilderness and burning the settled lands of human habitation" as an example of a "more-than-human political moment."

53. When interviewed by Jane Bennett (2010, p. 106) on whether he "thought that an animal or a plant or a drug or a (nonlinguistic) sound could disrupt the police order [an important philosophical and political distinction in Rancière's thought], Rancière said no: he did not want to extend the concept of the political that far; nonhumans do not qualify as participants in a demos."

54. The authors of this chapter have debated whether Rancière's theory can be extended to include other life forms. The most challenging condition is his axiomatic criterion of *equality* as a condition for politics. Political agents need to rupture the police order *in the name of equality*, uttering sounds that claim equality for all (Rancière 2010, 2014). An opening for an extension lies in Rancière's categorically

aesthetic, and thus nonanthropocentric approach to politics. It is rupture itself as a singular event that brings about a new state of affairs in which new speaking beings become hearable and intelligible, which in theory does not preclude any other life form. However, we have not come to a full agreement or conclusion on this matter. For concrete case studies in extending the political community via Ranciére, see Booth and Williams (2014) and Cohen (2015). For further discussions about Rancière and political ecology, see de la Cadena (2015) and Swyngedouw and Ernstson (2018). See also Latour (1993) and Stengers (2010).

55. Latour 2005a, 13; emphasis added.

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III Popular Natures

6 Nature's Popular Metropolis: The Greening of the San Francisco Bay Area

Richard A. Walker

No study of urban natures can afford to overlook the case of the San Francisco Bay Area, the greenest of cities in the United States. It has earned that title by virtue of over a century of conservation of open space, bay waters, and coastal areas the length and breadth of the metropolitan area. The Bay Area is replete with what might be called "popular urban natures" because the landscape of the region bristles with parks, open spaces, and other protected areas that are the result of widespread mobilization of committed citizens, fierce outbreaks of environmental politics, and thoroughgoing incorporation of green spaces in public life. I have assayed the depth and breadth of this process of popular nature-making in the city elsewhere; I use this opportunity to elaborate on the key ideas in the making of urban natures and show how they must be grounded geographically and politically.[1]

The argument proceeds in three parts. First, the bay metropolis encompasses a huge array of open spaces—loosely called the "greenbelt"—that have become an everyday part of the urban scene, experienced as scenic backdrop, as recreational areas, and as integral to local residents' sense of place. That greenbelt is widely viewed as preserved wildland, in contrast to the artifice of the city, yet it is anything but nature in the raw. It is an urbanized nature—a socionatural hybrid profoundly transformed by the encounter between city and country and between popular ideas and practices and ecological processes. Second, the greenbelt landscape can be understood as popular urban nature in the crucial sense of being the consequence of strenuous political activity by a mobilized citizenry that has been well organized, well led, and well heeled. Popular spaces of urban nature have been achieved through a sustained struggle in counterflow to the dominant logic of profit-making, expressed in terms of the public interest and manifested in publicly accessible open space. Third, the successful fight to naturalize the Bay Area landscape has generated enduring organizations, scientific defenses of nature protection, and legislation enforced by agencies of the state. Popular natures necessarily become governmental, but no less democratic for all that, because they are movement generated (and defended) rather than imposed from above. These three arguments define the three sections of the chapter.

In the conclusion, I put the San Francisco story in broader geographical perspective. It presents an outstanding case of how the experience of one locality with urban natures was the foundation out of which grew a legacy of national environmental leadership and even global impact on conservation efforts from Alaska to the Amazon. It shows that sweeping glosses on global urbanization, urban ecologies, and environmental resilience need to be seen as local-global dialectics, rather than universal processes, precisely because the social ecologies of different cities follow a wide range of pathways. In some cases, like that of the Bay Area, the local is so potent that it *becomes* the global.

Making Nature in the City

Cities are natural, in the sense that they are made up of natural materials, fed by flows of air, water and energy, and alive with living things. That is true, but too minimal to grasp what it means to create a "popular urban nature." Parks and open spaces are natural in being formed from the stuff of nature and unnatural in the sense of being products of human industry, so what kind of unnatural nature are they? One can say that they are *hybrids* of the social and the natural, following Erik Swyngedouw, but how did such hybridization come about?[2] In this section, I build a reciprocal approach to urban natures in the San Francisco Bay Area in four iterations: unnatural blessings, country in the city, culture of nature, and vitality of nature. I call the resulting urban landscapes *metro-natural*: nature thoroughly integrated into urban space and the urban experience.

Unnatural Blessings

Nature has undoubtedly been kind to the Bay Area. The natural setting, hard by the Golden Gate, is very much its trademark. The watery expanse of San Francisco Bay gives the metropolis its centerpiece. The surrounding hills, golden in the summer sun, provide a topographic counterpoint to the bay and are backed up by mountains thick with wooded canyons, oak savanna, and evergreen chaparral. Dramatic fog banks blow in from the Pacific, with its sandy shores and blue-green vistas. And an abundance of sunshine is mixed with highly variable winter rainfall, marking this as one of the handful of Mediterranean climate zones of the world. It is said to be one of the most beautiful cities and agreeable places to abide on earth. Moreover, not far away lie the incomparable California landscapes of redwood forests, Big Sur, and the Sierra Nevada.

The inspirational quality of the local landscape is an article of faith among local environmentalists. As Dorothy Erskine, founder of People for Open Space, put it: "Our surroundings are so dramatic that I think that it has generated a certain emotional drive that led to victory in the battle for the bay, and advanced our region farther than other parts of the United States in consciousness about the environment."[3] While there is an element of truth to this mythology, San Francisco has a horrendous record of environmental destruction. It grew rich by tearing asunder the mountains for gold and silver, laying waste to the rivers and forests, filling and polluting the bay, and paving over magnificent sand dunes.[4] Natural beauty did not, therefore, come with an insurance policy that it would not be filled, fouled, carved up, and cut down. A verdant nature did not grant San Francisco the kind of urban landscape one finds today, replete with parks and hiking trails, second-growth forests and tidy vineyards, or a bay full of sailboats and Chinese mussels. So we have to look to human origins for the kind of naturalized city made up of green and blue open spaces among the built-up zones of the metropolis.

On closer inspection, the naturalized landscape of the Bay Area is a crazy quilt of parks, reserves, refuges, and other kinds of open spaces, protected by a panoply of laws and governments. In this metropolis of 8.5 million people, the fourth largest in the United States, over one-quarter of its territory (1.25 million acres) has been set aside as what local environmentalists call "secure greenbelt." It is not, in fact, a belt at all, but an interwoven patchwork of over two hundred protected areas within fifty miles of San Francisco, which add up to considerably more land than Yosemite National Park—and that does not include the even larger area protected by the Bay Conservation and Development Commission and the California Coastal Commission, or three oceanic reserves off the coast.

Hence, the naturalized Bay Area landscape that locals and visitors visualize as a wonder of nature is a thoroughly socialized and artificially maintained part of the metropolis. The greensward is an act of social engineering. Without that intervention, there might be very little open space left, no beautiful vistas to contemplate, no beaches to swim at, no lovely parks to picnic in. The Marin Headlands, Point Reyes, and the rest of the coast would be lined with houses, Mount San Bruno and Angel Island leveled, the bay filled with rubble, and freeways shooting in all directions. That this did not occur is due to repeated mobilizations, battles, and laws, not just the presence of an inspirational nature. Every inch of open space has been fought for. The metro-natural Bay Area landscape rests firmly on the unnaturally successful accomplishments of popular efforts at conservation.

The Country in the City

While it is commonplace to say that the city is reworked nature and that nature in the city is massively altered, we need to take a closer look at the geography of how that mutual transformation unfolds. The making of urban nature takes place through the encounter between city and country. To begin with, cities demand a countryside to service their metabolic needs for minerals, food, energy, and water, as well as to absorb city refuse, and this creates an urbanized countryside. The urban extraction of rural resources is usually presented as taking place at great distances, but it is, if anything, more intense close by the city, as Von Thünen noted two hundred years ago. The urban periphery is the backyard of the city and fiercely exploited.[5]

Next, the geography of city and country is deeply interdigitated; the city does not just march over rural areas in a “the wall of sprawl,” as local environmentalists call it. In fact, the metropolis expands in solar bursts along transportation routes and topographies of least resistance, enveloping rural landscapes. Meanwhile, rural land uses are reconstituted in the interstices, and the countryside never entirely disappears; it becomes interwoven with the city. In the Bay Area, for example, large swaths of land are still reserved as watersheds for domestic water supply and grazing land for dairy cattle. Some rural activities, such as gravel quarries, actually intensify as the suburbs engulf them. A remarkable instance of this is the expansion of the wine industry in Napa and Sonoma counties, sporting vineyards planted with the precision of subdivisions.[6]

In short, city and country coevolve and their boundaries are ever-changing. The green spaces of the metropolis begin not as leftovers of an archaic nature or an agrarian paradise; they are urban-rural hybrids of considerable extent. In the nine-county Bay Area, which consists of roughly 4.5 million acres, only three-quarters of a million acres lie beneath buildings and pavements. By contrast, agricultural, grazing and forest lands occupy about 1.75 million areas, and at the center of it all is the bay, another three-quarters of a million acres. The metropolitan landscape is, thus, a coat of many colors—yellow, green, brown, black, blue, and gold—made up of fields, woods, highways, houses, creeks, and reservoirs.

Moreover, as city and countryside collided in the Bay Area, something entirely different arose, a third kind of space. People like Dorothy Erskine, who cared deeply about local landscapes, were moved to demand the conservation of open spaces as part of the urban experience. From their lead a social movement was born to conserve the metro-natural landscape by reworking former bits of countryside into new elements of the city and reaching out into the working countryside to outflank the exploding metropolis. This movement to create metropolitan open spaces, or popular urban natures, was born of a reaction to the bulldozers of development leveling the familiar bits of the urbanized countryside and the desire to keep hold of ruralized nature as a counterpoint to the city.

A Culture of Metropolitan Nature

Why did Dorothy Erskine and her comrades love local landscapes so much that they were determined to save them? The geographer Yi-Fu Tuan calls the love of familiar landscapes *topophilia*, but it is too static a notion to explain popular views of nature in a dynamic urban setting. The continual mingling of country and city complicates the geography of environmental sentiment, as does the quilting of the protected landscape of the greenbelt. Raymond Williams, looking critically at the English ideology of landscape, showed how the deep connections between the urban and rural in early modern England gave rise to a distinctive "structure of feeling" about that country's green and pleasant land.[7] In the Bay Area, too, a structure of feeling about green and open spaces has emerged out of the encounter of city and country and the protection of urbanized nature.

Bay Area environmentalism is a product neither of an abstract love of nature nor of the elevated values of urban life, but of dreams of rural idylls

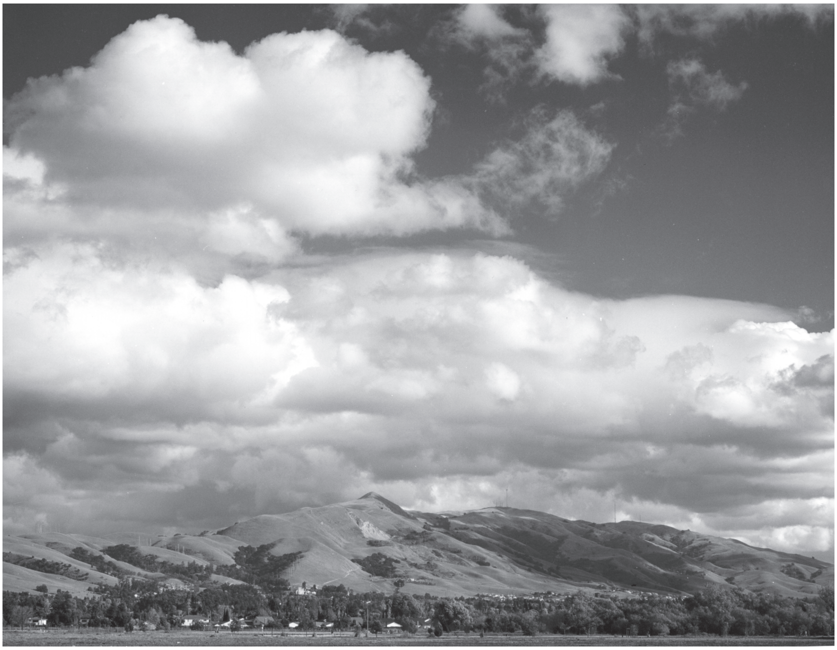

Figure 6.1
Mission Peak Regional Park, east side of Silicon Valley, ca. 2004. Photo copyright Alvin Docktor.

turning into nightmares of urbanization. It was born in the transitional realm where city and country collide, where housing developments laid waste to oak savannas, freeways ran roughshod over hill and dale, and garbage dumps encroached on the bay. Contrary to the view that American conservation arose chiefly from an ideology of wilderness,[8] the most valued natures have often been the ones nearest the city. In the Bay Area, these include such cherished venues as Muir Woods, Mt. Tamalpais, and Mt. Diablo, as well as the familiar landscapes of the Palo Alto foothills, Mission Peak, and Carquinez Straits (see figure 6.1). These are the most accessible, visible, and threatened of urban natures and the sites of defining fights over open space in the San Francisco region. They are not a passive backdrop to the city, but zones of social conflict where a love of hybrid natures has been acquired through battle. Every inch of protected open space vibrates with history; the greenbelt is a living landscape redolent with meaning.[9]

A local structure of feeling, or popular culture of nature in the city, has been constructed on the basis of the material achievements of the conservationists and the quilt of naturalized spaces they created. It is inculcated among the general public through experiences of hiking, going to the beach, riding a ferry, or looking at the scenery. Living in and around a protected San Francisco Bay is the keystone of the whole edifice. Schools teach conservation, environmental organizations preach it, and the popular press affirms it. Everyday life and the ordinary practices of residents of the Bay Area lead easily to their becoming "metro-naturals," who share a unified and naturalized sense of the landscape.

Geographers have long grappled with this process of consciousness formation in relation to material landscapes. Kenneth Olwig refers to the sense of identification with local surroundings as an "invisible fellowship of the landscape." Allen Pred has investigated the "everyday world of being and becoming" in reference to modernity. Alex Loftus speaks of an "everyday environmentalism" arising from oppositional practice and class conflict. Henri Lefebvre famously declared the all modern experience has become urban, resonating between landscapes and representations. These ideas surely apply to the naturalized spaces of the urban greenbelt and the culture of nature inculcated in and through it.[10]

Furthermore, the Bay Area culture of nature is an ethical universe. Moral value is placed on the greenbelt, which is seen as the city's saving grace. On the one hand, open space naturalizes the metropolis with greenery, vistas, and wildlife; on the other hand, open space humanizes the city by providing places to play, think and escape. Moreover, a city is rendered more humane because its green lands are as much human- as nature-made and the product of popular action; therein lies their secret pleasure and moral worth.[11]

Resplendent Nature in the City

The story of the metro-natural landscape of the Bay Area does not end with the human achievement of setting aside and learning to love the green quilt of open space. Although there is no longer very much, if any, primal "First Nature" in the city, the metropolis is not undifferentiated "Second Nature," as one might think from some theorizing about modern environments.[12] Urban natures are hybrids in several senses. For one, the metropolis features a wide variety of spaces and ecologies; not only are the streets of San Jose a far cry from the uncut redwoods of Big Basin, they are also different from the backyards, community gardens, and mini-parks tucked into the urban fabric. A second sense of hybridity in urban natures is in how similar background conditions have been worked up into vastly different results: both the rows of boxy houses of the Sunset District and the tree-covered reaches of Golden Gate Park were carved out of enormous sand dunes on the western flank of San Francisco. A third dimension of hybridity is the way urban natures have been reworked over time. This is clear in the built-up areas, which have been reconstructed time and again in the old central cities; but even a place as wild as Point Reyes bears the imprint of successive use for fishing, grazing, second homes, and tourism.[13]

At the same time as we admit the transformed, humanized, and hybrid nature of urban natures, there is more to it than that. We need another term that speaks to the kind of verdant natures that endlessly crop up in the city, from backyard bees in Oakland to feral turkeys in Berkeley to the teeming benthos of San Pablo Bay. I like to think of these resplendent green and blue places as "Third Nature." Urban ecologies have an amazing resilience, an overlooked fact that has been crucial to the success of popular urban natures from Cape Town to Boston. Cut back on pollution, and oysters can get reestablished. Open the dikes on the salt ponds, and marshlands reappear. Stop poisoning coyotes, and they roam the streets of San Francisco (much to the chagrin of pet owners). Of course, some of these revivals require more human intervention than others: clapper rails remain a fragile wetland species, while wild boar run amok in the oak woodlands. In this sense, urban natures are not just social products (Second Nature) or even socionatural hybrids; they are altered natural systems that nonetheless retain a certain autonomy and causal force.[14] That is, they have powers of recuperation that fill up the open, ruralized, and naturalized spaces of the city and alter ideas about city and country and practices of urban living, including conservation efforts. They, too, are metro-natural.

In sum, what we see in the San Francisco case is a long-term spiral of city and country, reservation of green spaces, a culture of nature, and recuperated natures developing synchronously and chronologically. This interplay of nature, social practice, and structures of feeling is the multiple hybrid I am calling the "metro-natural landscape." It is the first step to understanding what is meant by popular urban nature in the Bay Area. But there are two more steps to a full comprehension of the achievement of a metronatural region.

Politicizing Nature in the City

We can only get so far in coming to grips with the constitution of popular urban natures by resting in the realm of the geographic encounter between people and landscape in the city. We have to move to a different plane of analysis, that of politics, to inquire how a century of environmental activism in the San Francisco region stitched together such an enormous metropolitan greenbelt. One can draw three important lessons from that experience. The first lesson is that the people of the Bay Area became well organized in the defense of open space and succeeded in building a mass environmental movement. Second, the social nature of the Bay Area has been critical to the ability of a mass green movement to prosper in the public realm. Third, green politics in the region developed in a favorable political environment with deep traditions of public interest politics and progressive thought.

Building a Popular Movement

Bay Area environmentalism is a social movement that grew from many seeds and continues to flourish right up to the present. A first step to success was to get organized. Strong green organizations have been essential to bringing people together, mobilizing resources, and providing leadership. They have, moreover, been critical instruments for transmitting the prevailing culture of urban nature. Popular uprisings have generated hundreds of green groups seeking to preserve creeks and tidelands, groves and hillsides, trails and scenic views, beaches and wildlife.[15]

Organizing at different scales has also been vital, given the many levels of US urban politics. Local organization is one leg of the movement, embedding it in everyday experiences and demands; the other leg is regional organization, which has provided a broader perspective and more durable presence. The most important regional organizations are the Marin Conservation League, Save Mount Diablo, Committee for Green Foothills, Save the Bay, and the Greenbelt Alliance—the latter two stretching across the whole Bay Area. The Sierra Club and the Trust for Public Land also maintained a strong regional presence even as they went on to national prominence. Organizations of different scales have allowed the movement to encompass

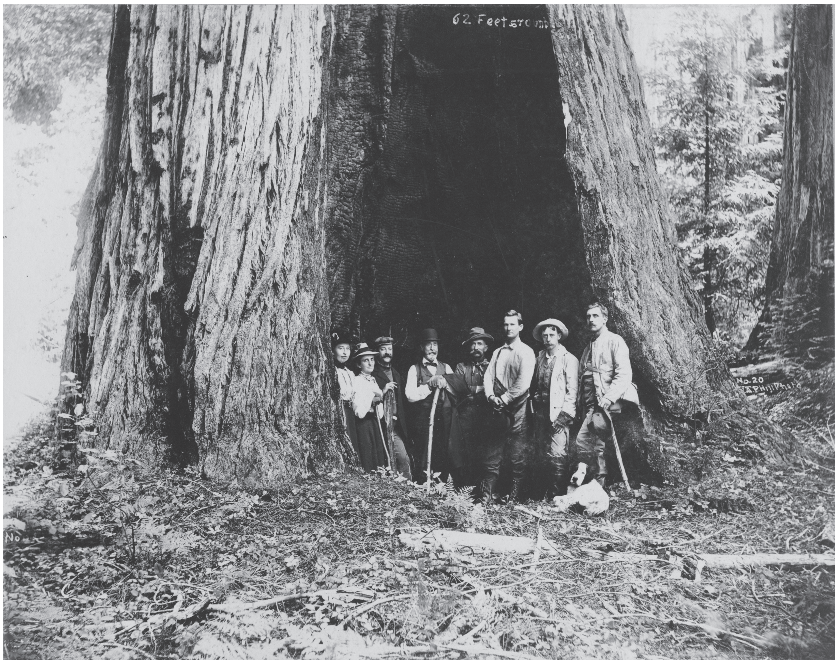

Figure 6.2
Founders of the Sempervirens Club at Big Basin Redwoods State Park, 1900. Courtesy of History San Jose.

a range of visions and respond to issues at the appropriate scale or to jump scale, as needed.[16]

Most of the green organizations of the Bay Area got a leg up thanks to the initiative of upper-class conservationists. Prominent businessmen and members of the local elite founded the Sierra Club, Sempervirens Club (see figure 6.2), and Save the Redwoods League around the turn of the nineteenth century. Wives of bankers and professors established the Marin Conservation League, Save the Bay, and the Committee for Green Foothills at midcentury. The prominence of the upper classes was especially marked in both periods. Old monied families, like the Alexanders and Kents, contributed to green causes, while family members from Caroline Livermore to Sylvia McLaughlin mobilized their networks in support of green organizations. More recently, wealthy philanthropists from Silicon Valley, such as the Moores and Packards, have poured money into green causes in the region.[17] Equally important is the upper middle class of educated professionals, especially around the universities at Berkeley and Stanford, who have provided key leadership for the movement. The movement has drawn on the large pool of intellectuals swimming in the buoyant waters of Bay Area cosmopolitanism, starting with Joseph LeConte and John Muir in the late nineteenth century, through Progressive-Era academics such as David Starr Jordan and William Dudley, to postwar writers like Raymond Dasmann and Ernest Callenbach.

Despite its elite origins, however, environmentalism metamorphosed into a mass movement in the Bay Area—the world's first such popular uprising for nature protection. In the 1960s, the Sierra Club, Save the Bay Association, and Save Our Seashore ballooned from a few hundreds to tens of thousands of members by appealing to the general public to defend San Francisco Bay, Point Reyes, and the Colorado River. The bay, above all, became a wildly popular cause that converted vast numbers of locals (including me) to the legions of green. This mass appeal ultimately drew hundreds of thousands of supporters into green organizations across the region by the late twentieth century. The middle class has been eager to support Bay Area open space, and so has a working class mindful of the need for clean air, energy conservation, and recreational areas. The unions have often lent their voices to conservation causes such as the formation of the East Bay Regional Parks in the 1930s, the Golden Gate National Recreation Area in the 1970s, and urban growth boundaries in Sonoma County in the 1990s. Over the last twenty years, people of color—who make up most of the contemporary California working class—have been prominent in campaigns to control pollution and have voted in large majorities for more parks.

To outsiders, it may be hard to believe that there could be so wide a popular alliance behind conservation in the Bay Area. After all, schisms over environmental issues between workers and elites or between whites and blacks are legion in the United States, and often worse in the global South. I have no wish to deny the reality of social injustice in the bay region, the racial blindness of upper-class whites, or the tensions between greens and environmental justice activists in places like West Oakland and Richmond.[18] Nevertheless, the breadth of the popular movement for nature protection in the Bay Area is striking, and one sees less of the reactionary outlook among the upper classes that open space is to be defended *against* the rabble than one sees in cities like Delhi or Cape Town.[19] The question is, why?

A Favorable Social Environment

Political economy has undoubtedly played an important part in the Bay Area's environmental politics and metro-naturalism. Rapid and repeated growth since the Gold Rush has meant that the region never wallowed in the kind of distress that gives rise to appeals to development at any cost or, worse, the race to the bottom by cutting taxes and neglecting social infrastructure. The Bay Area economy has long been on the high road of economic development via investment, innovation, and entrepreneurship. As Michael Storper argues, the social dimension of political economy is decisive for explaining urban innovation; it requires a rich matrix of formal and informal institutions that bond economic actors together and bridge gaps between disparate economic networks. The Bay Area not only has such a matrix, but has built a strong sense of identity and mobilization around its innovative character. The result is the richest metropolitan area per capita in the United States with the highest percentages of billionaires and millionaires, creating an ample reservoir of funds to support green organizations and causes.[20]

The class structure of the Bay Area has been very favorable to environmentalists. Along with its many wealthy families and prosperous businesses, the area is noted for a high-end employment base in electronics and the internet, war and security, medicine and biotech, higher education, and finance, administration, and business services. These sectors have demanded a well-educated technical, managerial, and professional labor force, which is why the region has the most college graduates per capita of any US metro area and second most PhDs. This large upper middle class has provided many potential adherents to the environmental movement and capable leaders for the green organizations of the metropolis. Furthermore, there has been a substantial white-collar middle class consisting of teachers, nurses, office workers, and the like, as well as a skilled and well-paid blue-collar working class that has fought for its fair share of the pie. There is, of course, a substantial lower working class toiling in menial jobs without protections, made up overwhelmingly of immigrants and their children. Their conditions are often lamentable, but because of continued growth, influx of new recruits and upward mobility, no large, permanent underclass has formed. The result has been a higher average income and lower poverty rate than in any other city in the United States, let alone any of the metropoles of the global South.[21]

Another factor attenuating the effect of class is the cross-cutting influence of gender. The most important group of rebel spirits in the Bay Area has been women, who have served as the shock troops of the conservation movement.[22] Women like Dorothy Erskine, Amy Meyer, and Janet Adams are the unsung heroes of popular environmentalism in the Bay Area. Through the middle of the twentieth century, such women were usually college-educated mothers and housewives married to businessmen and professors. More recently, they have been lawyers, scientists, and managers in their own right, filling the ranks of green nonprofits. Why have women been so prominent? On the one hand, they may be upper class but they are rarely capitalists; the male domination of business and family has always raised questions about how class and gender intersect. Conversely, women's role as prime caregivers and nurturers has meant an intense involvement with human well-being. Their affinity for metro-naturalism has often arisen from such things as the loss of woods where children play, contamination of drinking water, or fumes from nearby factories, not just views of the Golden Gate.[23]

Swimming in Progressive Seas

The green movement in the Bay Area has had a distinctly progressive cast over the last century, a key dimension of the metro-naturalism of the place. On the metric of opposition to capital's unchecked ambitions, Bay Area greens get high marks. Groups like Save the Bay, Committee for Green Foothills, and Save Mount Diablo have consistently taken uncompromising stands against real estate promoters, industrialists, and the state over large scale developments, whether for new towns, research parks, or highways. Similarly, regional environmental organizations like the Greenbelt Alliance, Communities for a Better Environment, and the Sierra Club have been among the strongest opponents of forms of production, transportation, and suburbanization that increase energy use and poison the city—and people of color—with refinery emissions, diesel fumes, and other air pollution.

From its origins in the Progressive Era, conservation politics in the Bay Area took a more militant, preservationist turn, and its organizations maintained a greater degree of commitment to public parks than contemporaries such as the Boone and Crockett Club in New York. Berkeley graduates Stephen Mather and Horace Albright created the National Park Service in the 1910s. Save the Redwoods League started out believing in private parks and ended up as the chief advocate for the state parks system in the 1920s, behind realtor Duncan McDuffie. In the 1930s, the Marin Conservation League was already demanding (and winning) local land use planning to control urban growth. In the postwar era, the Sierra Club kept going down a road less traveled behind the likes of Dave Brower, Martin Litton, and Dwight Steele, as they turned against mainstream conservation on issues like nuclear power, multiple use, and clear-cutting. In the 1960s, San Franciscans led the first revolt against freeway mania, pushed for regional greenbelt planning, and froze development of the bay and the coast. Following that, the first popular opposition to dams and pesticides came out of Northern California in the 1970s. And so it has continued to the present, whether in the Greenbelt Alliance's demand for full protection of another million acres of open space in the region or Silicon Valley Toxic Coalition's campaigns to control global electronic waste.

Why this progressive cast to the popular green politics of the Bay Area? The political coloration of popular social movements is by no means a given of mass mobilization nor of a favorable social structure. Populist movements have often taken a conservative turn, and environmentalists have frequently demonstrated a weak commitment to environmental justice across class and race lines.[24] Bay Area metro-naturalism derives from a distinctive political environment and trajectory of conservation politics.

First, given the well-heeled character of so many Bay Area greens, there is a strong element of class interest in guarding metropolitan open space; the bourgeoisie are prodigious consumers of space, with large properties, a capacious sense of entitlement, and a love of scenic views (what Williams called "pleasing prospects"). Nonetheless, many of the elite have gone against the grain of class interest to question the profit-making that provided their family fortunes and elevated incomes. One reason is that they have so often been forced to defend the redoubts of privilege from the unrelenting onslaught of industry, commerce, and land development. The Bay Area's dynamic economy has provided plenty of grist for the conservationist mill, from clear-cutting redwoods in Marin to filling the bay to create Foster City to covering the foothills behind Stanford with industrial parks.[25] But there is more to why Bay Area conservationists came to question untrammeled profit-making from land and to stand "in opposition to blind progress," as they have often put it.

A second element of a progressive green movement is the strong legacy of public lands that resulted from federal ownership of large portions of the western states. While in states like Nevada the federal presence evokes resentment, in California, where much more land was privatized in the nineteenth century, continuing federal stewardship has been a foundation for conservationists to protect vast acreages in national parks, wilderness areas, and national forests. This notion of public lands has carried over to the state parks system and, aided by state control of coastal waters up to the high tide mark, to the establishment of many state beaches, the protection of the coast and of San Francisco Bay, and the creation of offshore state and federal oceanic reserves.[26]

A third source is a commitment to the "public interest," a legacy of the Progressive reform tradition in California. Popular revolts marked by the Second Constitutional Convention of 1879, the victory of Hiram Johnson and the Progressive Republicans in 1911, and the New Deal era of the late 1930s and 1940s unleashed waves of reform of politics, government, and the use of natural resources. The postwar environmental movement renewed that tradition, with Bay Area metro-naturals firmly committed to the idea of *public* space: parks, reserves, and offshore waters dedicated to public use, open to all, and treated as common property. Even in wealthy Marin County, vast tracts are readily accessible and widely used by people from other counties. The East Bay Regional Parks are well stocked with public swimming lakes, picnic areas, and playing fields enjoyed by millions of working-class families. Save the Bay not only fought against fill, it demanded public access to the waterfront, and the same is true of coastal campaigners; as a result, piers, paths, and beaches are packed with folks from all walks of life. This is quite at odds with the experience in places like Westchester County, New York, or the shores of Chesapeake Bay, which have lots of wildlife reserves but little public land or public access.[27]

Last, Bay Area environmentalism has drawn on many radical currents prevalent in the region. Such ideological cross-dressing includes socialism, anarchism, antimodernism, eastern religions, gay and women's liberation, and lifestyle countercultures. For example, Gary Snyder, an inspirational writer of deep green persuasion, combines Zen, bioregionalism, and Wobbly sentiments in a seamless whole. Kenneth Rexroth, whose bohemian soirees launched the Beat movement in San Francisco, loved backpacking in the Sierra as much as anarchism and Chinese poetry. Robert Walker, whose powerful photographs played a key role in saving Mount Diablo, founded the Gay Sierrans within the Sierra Club. In short, green is one of the colors on the rainbow flag of the Left Coast, where politics and cultures have long been out of step with the rest of America.[28]

To summarize, the success of popular movements for nature conservation in the San Francisco region has been a broad-based political achievement, made possible by a wide array of green organizations, leadership and funds from the upper classes, hard work by dedicated women and men, appeals to the public interest that cross class and race lines, and fight after fight against the unrelenting forces of development.

Governing Nature in the City

Beyond the urban encounters with nature discussed in the first section of this chapter and the elements of political style analyzed in the second, a third arena has been vital to the creation of the metro-natures of the San Francisco Bay Area. The triumph of popular conservation could not have been realized without three key facets of urban government: planning, regulation, and science. These speak to the idea of "technological natures" in the urban field and the influence of planners, administrators, and intellectuals. While supporters of popular urban natures such as Henrik Ernstson take a suspicious view of expertise and top-down approaches to governing urban natures, popular mobilization is rarely sufficient by itself. Without the state, planning, and expertise, opposition to the machinery of capitalist growth and urban expansion would rest on weak reeds; the people are wise and strong in many ways, but they have to mobilize higher powers to instantiate their vision of metro-naturalism.[29]

Planning and Regional Vision

Like so many social movements, Bay Area conservation has all too frequently involved defensive, piecemeal actions by local groups feeling the hot breath of the bulldozers on their neck of the woods. Nonetheless, an overarching vision of containment of the city emerged to provide some guidance to the swirling battles all around the metropolitan area. This has been the function of one organization above all, People for Open Space, founded by Dorothy Erskine and Jack Kent in the 1950s to bring recreation planning to the metropolitan region, and transformed into the Greenbelt Alliance by

William Evers and Larry Orman in the 1980s to provide a regional vision for proliferating local antigrowth movements. The story of Bay Area environmentalism cannot be told without the influence of planning and planners, who were crucial in turning the fight from one of conserving natural areas to battling the juggernaut of urban expansion. Land-use conflicts have shown, time and again, the need to tackle the logics of sprawl, housing supply, and local land use regulation. Conservationists have had to join forces with urban planners to rewrite the rules of the game of urban growth and land use controls. In the process, urbanization stopped being taken as an unquestioned good or unchallenged rule of economics, as in so much of the United States, and was rethought, reconfigured, and redirected.[30]

Several strategies have been tried in the effort for urban containment. One was to seek metropolitan government. It has been a planning mantra going back to the Progressive Era that if government can be rationalized, good land use will follow. As postwar US cities flew apart into thousands of suburban pieces, municipal fragmentation came under heavy fire from planners and political scientists, with the Bay Area a center of government reform agitation in the 1950s. Metropolitan government never got far, however, given the American faith in "home rule."[31] Nonetheless, planning reformers got the California legislature to require local general plans with open space elements and conforming zoning regulations, which green activists have used to good effect ever since.

The legislature even gave the toothless Association of Bay Area Governments (ABAG) the job of preparing a regional growth plan in 1970. ABAG's planners were emboldened to produce a document calling for city-centered development and a greenbelt covering one-third of the region. As Kent observed, "There is no other metropolitan region in the USA that has ever said there ought to be a big permanent greenbelt around its existing system of central cities."[32] Local politicians and developers killed the official plan, but the greens were not daunted. They used the plan as a guidebook for a Greenbelt Action Program that would marry comprehensive planning for housing, employment, transportation, and open space with popular mobilization along the lines of Save the Bay. Forty years later, they have achieved most of what the regional plan called for.

Local communities aided the greenbelt planners by an upsurge of municipal struggles against untrammeled urban development in the 1970s, which came to be called the Growth Control movement. The little city of Petaluma shocked the world of planning law by establishing a maximum number of housing units per year, keeping the 101 highway strip under rein, protecting its historic downtown, and maintaining a visual break between the urban and the rural. San Jose—the poster child of postwar sprawl—did an about-face to adopt an urban service limit line, development fees on subdividers, and a strong general plan, becoming denser than any other Sunbelt city, as a result. The most far-reaching change came to Marin County, which imposed a general plan that put the entire west county off limits to development.[33]

Meanwhile, the Greenbelt Alliance started putting staff in the suburbs to work with local growth-control groups to provide planning expertise and a regional vision. It thereby helped build a regional greenbelt from *both* the bottom up *and* the top down. As a result, the movement to harness city growth in the Bay Area did not degenerate into a grab bag of local turf fights, but became a collective project greater than the sum of its parts. This was exactly the kind of popular movement consolidation that Raymond Williams envisioned in his concept of "militant particularism."[34]

Greening the State

The regulatory and administrative powers of the state have been absolutely necessary to the success of the metro-naturals of the Bay Area. Law and government are the solid reef that the conservation movement built out of its political victories, one that has grown piece by piece to make the greenbelt a permanent feature of the urban landscape and city life in the region. Contemporary social theory has difficulty with the dialectics of social movements and state power: the Right dismisses state action as useless interference with the "free market"; the liberal center denatures the state by speaking only of "governance" not of the hard structures of government; and the Foucaldian Left focuses on "governmentality," or the state's efforts to shape social subjects. In the struggle over urban space, however, the role of law and state power cannot be overlooked in the people's struggles for a "right to the city," as Don Mitchell and James Holston have observed.[35]

The Bay Area greenbelt is made up of a multitude of government-owned parks, reserves, and open spaces at every scale—national, state, county, regional, and city. The first such urban parks were created in the nineteenth century, but the modern chains of parks took shape only in the 1930s with

New Deal support. After World War II, money flowed briskly from state and local governments, which enjoyed ample tax revenues and easy sale of government bonds. Hundreds of thousands of acres were put aside around the Bay Area during the high tide of park making. The wolf came to the door in 1978 with the tax revolt in California, which cut government revenues dramatically and dried up acquisition funds.[36] Yet a strange thing happened on the way to ruin: people in the Bay Area kept voting for bond issues and special taxes to enlarge the parks system.

Most parks were created for recreation, even as they protected some of California's prime scenery and natural wonders. Recreational parks and excursions were vital to the development of mass environmentalism in the postwar era because they taught large numbers of people the pleasures of outdoor activity and inculcated a love of forests, beaches, and rivers. At the same time, the parks demanded rangers and other administrators, who developed the arts of managing these naturalized spaces in and around the city; the necessary managerial, ecological, and public relations expertise was by no means self-evident and had to be learned through trial and error.[37]

Meanwhile, powerful regulatory bodies were established to defend San Francisco Bay and the California coast, as well as to control air and water pollution. The bay and coast are essential to San Francisco's famously scenic setting, but their destruction was assured had not the greens won permanent protections from the state in 1965 and 1972, respectively. The Bay Conservation and Development Commission has been spectacularly successful and was cited by the first United Nations Conference on the Human Environment as a model of citizens' initiatives. The creation of the California Coastal Commission, the Coastal Conservancy, and offshore state and federal marine reserves followed in short order.[38]

Science for the People

Popular organizations and state officials have all depended on the expertise of scientists and the spread of scientific insights in their efforts to build and manage the Bay Area greenbelt. The region has a particularly sophisticated public and many well-educated activists, so the level of environmental knowledge has been high going back to the late nineteenth century. Scientific research and education have gone hand in hand with public mobilizations on behalf of urban natures, and the Bay Area has often been a fountainhead of environmental science as part of its leading role in land and water conservation.[39]

The local environmental movement has been bolstered repeatedly by Bay Area scientists trained in ecology, geography, and forestry, who have questioned everything from pesticide abuse to the viability of high dams. They have been crucial in providing the green organizations with technical expertise, speaking to councils of government, and infusing the movement with new ideas. The same has been true of the development of planning theory in the Bay Area, backed up by some of the first sophisticated critiques of suburban sprawl and New Urbanist theories of high density development.[40]

One important advance is the growth of knowledge about San Francisco Bay, including the earliest extensive research on estuarine systems, which has been followed up by years of research on the fiercely contested Sacramento River and Delta system. The San Francisco Estuary Institute studies invasive species in the continent's most altered estuarine ecosystem, while research on ocean upwelling, phytoplankton, and marine productivity has flourished, especially around the Farallon Islands and Monterey Bay. Wetlands restoration science is more advanced here than anywhere else, as is wildlife rescue at the Marine Mammal Center.[41]

Another highly developed arena of knowledge construction about urban natures in the Bay Area is that of toxic pollution and health. Some of the earliest studies of radiation poisoning, chemical toxicity, electronics dumping, and body-burden were done here in conjunction with the activist work of groups like Communities for a Better Environment, Breast Cancer Action, the Silicon Valley Toxics Coalition, and the Natural Resources Defense Council. Environmental health science has been advanced thanks to the region's large medical research complex and hefty funding from the socially oriented California Wellness Foundation, the HealthCare Foundation, and the Kaiser Foundation.[42]

In order to instantiate popular demands for nature in the urban landscape, it is not enough to have great green ideas and political movements. It is necessary to build solid frameworks of planning, science, and government. Without this, we end up romanticizing popular struggles that have little long-term impact on cities. The imprint of popular natures in the San Francisco Bay Area has been grounded in the durability of green governance in this environmentally minded region.

[illegible] commons to give to landless Scheduled Caste households for cultivation. This was ostensibly a relatively painless pro- [illegible] roads of technology, finance, and commerce such as the Bay [illegible] land received titles to [illegible] ons, and [illegible] homes and offices for [illegible] hurdles required to secure building permissions, in return for a share in the leader at Stanford, David Harris, came up with the idea of Earth Day in 1970. In the 1980s, David Brower established the Earth Island Institute to incubate dozens of environmental groups worldwide, such as Baikal Watch and the International Marine Mammal Project. Friends of the River, formed to fight dams in California (where high-dam engineering originated), became the International Rivers Network operating in sixty countries. The Pesticide Action Network, created to fight California's chemically saturated agriculture, quickly went global and now counts six hundred partners organized in five continental groups. Rainforest Action Network based by the bay has been a key defender of the Amazon and Southeast Asian tropical ecosystems. The Goldman Prize, funded by San Francisco philanthropists, salutes environmental activists around the world. Critical Mass, the bicyclists' monthly challenge to car-dominated cities, has spread from San Francisco to cities around the globe. In other words, Bay Area green politics have impacted the rest of the world by virtue of an abundance of ideas, leaders, organizations, knowledge, funders, and alliances. It has been a fount of innovation in the realm of environmental policy, just as it has in the world of electronics and the internet.

The Bay Area's success in defending popular urban natures stands on three pillars. It begins with a metro-naturalism, or love of naturalized urban landscapes, rooted in a virtuous circle of saving open spaces and learning through everyday experience. Just as important, San Francisco built a popular green politics that featured strong organizations and dedicated leaders with a commitment to public access; in the process, green became one among many colors of the Left Coast's progressive flag because of its opposition to mindless growth and dedication to the public good. Finally, green sentiments have translated into a solid framework of law and regulation, land use planning and environmental science that maintain the Bay Area's hard-won endowment of protected land and waters.

In all this, time matters as well as space and place. Ideas and practices change with new challenges, as seen in the epochal shifts in conservation policies in the Progressive, New Deal, Postwar and Neoliberal eras. Today is an entirely new epoch for the environmental movement, one that presents severe new challenges to which popular forces and state policies must rise if any number of disasters are to be averted. Given the menace of global climate change, merely saving urban green spaces can seem as archaic as creating picturesque gardens in eighteenth-century century Britain. California is being hit by shrinking snowpack, more erratic rainfall, hotter summers, raging wildfires, and rising sea levels, to which people and governments must now respond. In the twenty-first century, the Bay Area is once more leading the way on a range of policies for renewable energy, carbon emissions reduction, and green building strategies to combat climate change.[46] That far-sighted approach to new challenges owes thanks to the legacy of environmentalism in the region, a citizenry well informed on the dangers of unbridled growth, and a state habituated to the need to regulate and plan for a sustainable future. A local culture of popular natures with deep roots and a strong political base is once again sending forth new green shoots.

Acknowledgments

Thanks to Henrik Ernstson and James Evans for their helpful comments.

Notes

1. This chapter draws on my in-depth study of conservation in the bay region, *The Country in the City: The Greening of the San Francisco Bay Area* (Walker 2007). Sources for all factual claims can be found in that book.

2. On the city as hybrid, see Swyngedouw (2006) and Heynen, Kaika, and Swyngedouw (2006).

3. Erskine 1976, p. 141.

4. Brechin 1999; Dreyfus 2008; Booker 2013.

5. Von Thünen 1826; Cronon 1991; Brechin 1999. On urban metabolism, see Wolman (1965).

6. On Bay Area land use, see Santos et al. (2014). On protecting Napa Valley, see Conaway (2002). On its landscape, see Grossinger (2012).

7. Williams 1973; Tuan 1974.

8. Nash 1967; Cronon 1995.

9. Stroud (2012) makes a similar argument about New England's forests.

10. Lefebvre 1970; Pred 1995; Olwig 2002.

11. On the ethical dimension of practice and protest, see Jasper (1997) and Sayer (2011).

12. On Second Nature, see Smith (1984) and Loftus (2012).

13. Watt 2016.

14. Davis 1998; Pollan 1991; Falck 2010; Stroud 2012.

15. For overviews of social movement theory, see Caniglia and Carmin (2005) and Davis et al. (2005). On organizations and social movements, see Minkoff and McCarthy (2005).

16. On scale and politics, see Walker and Heiman (1981), Smith (1992), and Herod (2010).

17. On movement resources and networking, see Diani and McAdam (2003). On elites in US conservation, see Hays (1959), Hurley (1995), and Rothman (1998).

18. On the schisms, see Bullard (1990), Hurley (1995), and White (1996). On continuing racial divides in the Bay Area, see Schafran (2013) and Walker (2018).

19. Contrast the story told by Baviskar in chapter 8 of this volume or by Kosek (2006) for New Mexico.

20. Storper 2013; Storper et al. 2015. Also see Walker (2001, 2008, 2018) and Walker and Lodha (2013). On the importance of resources for social movements, see Davis et al. (2005).

21. Storper et al. (2015). Being the world's greatest center of information technology has meant the amassing of huge fortunes at the top, and this has made the current Bay Area one of the most unequal cities in the United States; Walker (2018).

22. Curiously, women have been all but invisible in US environmental history, until recently. See Musil (2014) and Ungar (2014).

23. On male dominance of business in California, see Walker and Lodha (2013). On the development of women's political consciousness from the domestic outward, see Bookman and Morgan (1988) and Spencer-Wood (1994).

24. On American populism, see Postel (2007). On Southern California populism, see Davis (1990) and McGirr (2001). On environmental justice movements elsewhere, see Bullard (1990) and Hurley (1995).

25. On elite landscape tastes, see Williams (1973) and Heiman (1988). On the contrarian and even radical nature of the Bay Area's elite conservationists, see Erskine (1976), Thiessen (2010), Brower (2012), and Hart and Kittle (2006). For similar observations on New England's gentry, see Stroud (2012).

26. California has more acreage in federal parks than any state except Alaska—and the latter's huge national parks were the brainchild of Sierra Club president and

San Francisco resident, Edgar Weyburn. On battles over western public lands, see Langston (1995), Kosek (2006) and Nie (2008).

27. On the public interest idea in American politics of the Progressive and New Deal eras, see Rogers (2008). For a spirited defense of environmental law as public trust, see Wood (2014). On conservation in Westchester, see Duncan and Duncan (2004).

28. On the Bay Area's left tilt, see DeLeon (1992), Ashbolt (2012), and Walker (2018).

29. See Ernstson (2013), Ernstson and Sörlin (2013), and Lewis and Ernstson (2019). Contentious popular movements are neither ordinary politics nor governance, nor are they entirely outside the state (Tarrow 2012).

30. For a similar view, see Angotti (2008); what he calls "community planning" is a fertile combination of popular activism and guided government action.

31. Scott 1985; Dyble 2009.

32. Kent 1983, p. 59.

33. On the national debate unleashed by Petaluma and other growth control ordinances, see, e.g., Burrows (1978) and Brower, Godschalk, and Porter (1989).

34. Contrast this with the conservative nature of the 1980s "Homeground Revolution" in Los Angeles, portrayed by Davis (1990). On militant particularism, see Harvey (2001).

35. Mitchell 2003; Holston 2008.

36. On local government finances in the twentieth century, see Teaford (1984) and Sbragia (1996). On Proposition 13 and its aftermath, see Martin (2008).

37. On the growth of outdoor recreation, see Hays (1987) and Young (2017). On the difficulties of park and resource management, see Hirt (1994) and Langston (1995).

38. On the Bay Conservation and Development Commission, see Bodowitz (1985). On the Coastal Commission, see Healy (1978).

39. On early environmental science in California, see Smith (1987).

40. For example, Livingston and Blaney (1970); Fellmeth (1973); Van der Ryn and Calthorpe (1986).

41. Nichols et al. 1986; Cohen 1994; Williams Associates and Faber 2004. See also Booker (2013).

42. Belliveau 1981; Szasz 1994; Dillon 2017.

43. On geographic scale, see Massey (1994), Swyngedouw (1997), and Herod (2010).

44. Traditional histories of American conservation were always cast at a national scale; see, e.g., Hays (1969), Nash (1967), and Rothman (1998). That has changed; see, e.g., Klingle (2007) and Stroud (2012).

45. Smith 1992. On the way policies travel internationally, see Rogers (2008).

46. On California's energy and climate policies, see Walker and Lodha (2013), Knuth (2014), and Walker (2018).

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7 Invasion and Citizen Mobilization: Urban Natures in Dalian

Lisa M. Hoffman

It was a warm summer Saturday morning in August 2013 when the group of volunteers met to pull invasive plants in Dalian, a major port city in northeast China. Participants included recent high school graduates and individuals who had been retired for years, men and women, regular activists and new participants. All had gone through training provided by a well-established environmental organization about the targeted plant and its damage to the local ecosystem. After driving to the roadside not far from the universities where the work was to be done, the volunteers pulled protective clothing out of their bags—long sleeved shirts, long pants, gloves, and scarves for their heads and mouths—to ward off scratches and insects (see figure 7.1, *top*). They also shared machetes, clippers, and shovels, and tossed water bottles to each other because of the heat. When I attended another outing with the same organization in the summer of 2011, about twenty-five people congregated to listen to the director describe the invasive weeds and insects that had been introduced with imported plants and were impacting the local ecosystem. They passed around a sample leaf for everyone to see and touch, and then asked participants to pull them, which they did for about an hour before sitting together for lunch, chatting, and taking photos (see figure 7.1, *bottom*).

The physicality and materiality of such volunteering seem to be critical aspects of these experiences—the heat; the chopping, cutting and pulling of the plants; the backs bent and gloved-hands grabbing; the protective clothes; and the shared water, and often shared snacks. The plants themselves, described as invasive, indicative of things out of place and problematic, may be understood as active parts of the social processes of volunteering, which intertwines the work of nongovernmental organizations

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reduce congestion in Delhi, which afforded real estate developers favorable terms since they were not hampered by the Urban Land Ceiling Act, which prohibited private firms from undertaking large-scale projects in the capital city. Selling to developers made landowners cash rich beyond their imagination; farming was a subsistence activity at best, so villagers were only too willing to give it up in exchange for substantial sums of money. The value of land in the area around Mangarbani remained low until about 2010, when the road connecting Gurgaon and Faridabad began to be upgraded in anticipation of the eventual merging of the boundaries of these two expanding cities. The villagers in this area who sold their lands, including their claim to the Mangarbani forest, were doing only what most of Haryana's villagers have done or are waiting to do.[9]

*But what of the religious significance of Mangarbani? How could Gudariya Baba's prohibition be defied? When asked about this, some villagers reiterated their commitment to him. "***Baba ne kahaa ki yahaan koi lakdi nahin kaatega, pashu nahin charayega. Hum barson se unke kahe ko maante aa rahen hain***" [Baba said that no one will cut wood or graze animals here. We have been abiding by his words for ages], said Jairam Harsana of Mangar village. He also described what happened to those who violated the Baba's injunction: their livestock died; their wooden houses burst into flame. But by selling his title to the forest he is at a remove from these acts of retribution since he will not be the one doing the actual cutting of trees. He has regrets, though, about selling the sacred grove and, in 2011, signed a petition along with other elderly villagers asking the government to protect the forest. When asked how that would affect the rights of those who had purchased the titles to Mangarbani's land intending to develop it, he expressed his helplessness: "It was thirty years ago. We didn't know. It was only on paper. No one knew who owned which piece of land. We didn't think it would come to this."*

If there is regret in some quarters about losing the forest, other villagers seem to be taking Gudariya Baba's legacy in a different direction altogether. Near the Baba's simple whitewashed shrine is a newly built temple, painted stand-out saffron and all set to expand its precincts, adding more area and deities to the Shiva-led pantheon currently installed for worship. With the temple attracting more devotees and visitors, Mangarbani's spiritual center seems to be shifting away from Gudariya Baba to the standard Hindu multi-god multipurpose buffet and bringing a commercial element that was earlier

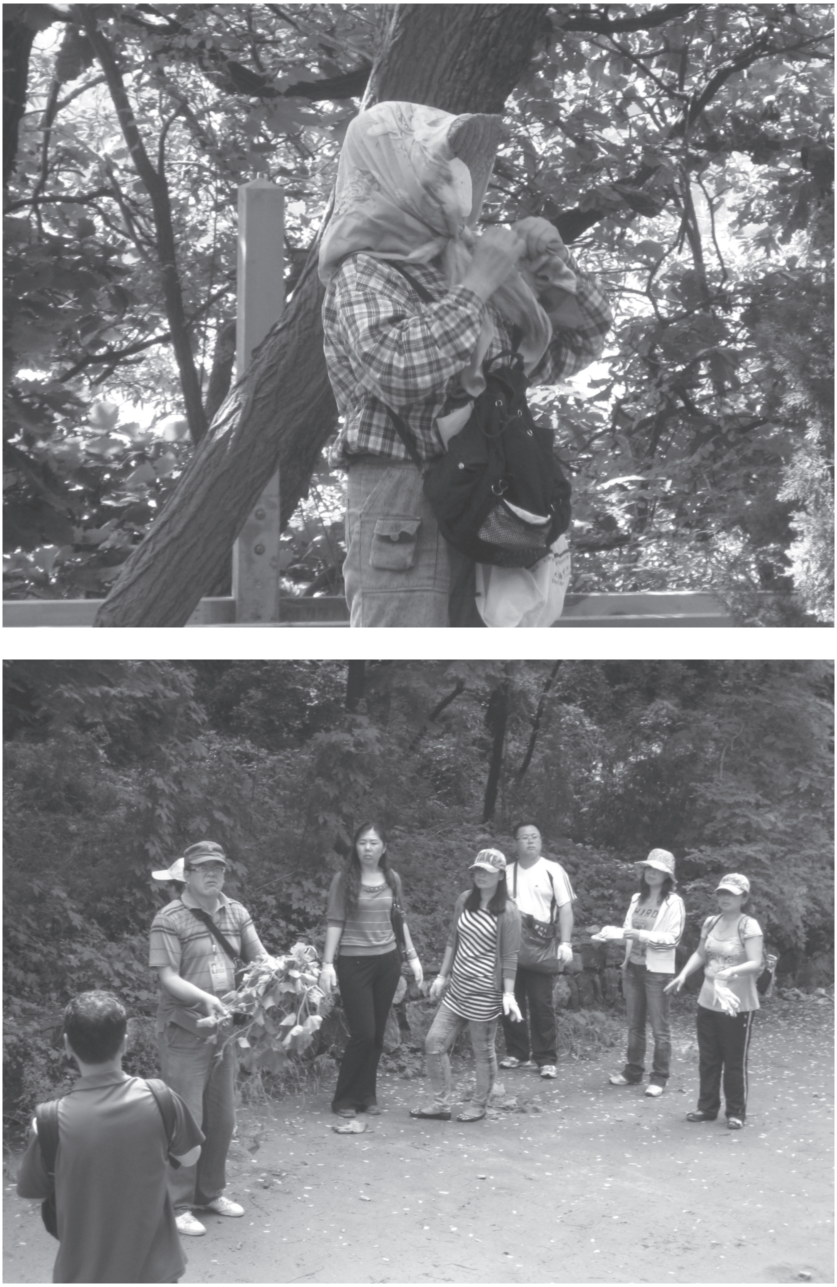

Figure 7.1

Top: An environmental volunteer with clothing to protect herself from scratches and insects. *Bottom*: A group of volunteers learning about an invasive plant before setting to work to eradicate it from a local park. Photos by Lisa Hoffman.

(NGOs) with transnational border-crossing politics of exchange gone awry. Rather than taking plant and human as separated, this chapter thus aims to think of them together, as plant-human. It thus asks what we gain by thinking across and through distinctions that typically frame ecological discussions (such as plant/human) rather than focusing on the break between them. As citizens are mobilized to pull these plants out of the ground and engage in ecosystem support, social worlds and collectivities are being constituted; norms of governing are being established; and urban natures are being understood as sites to negotiate government responsibility, individual contributions, natural beauty, economic development, and geopolitics. These voluntary, nongovernmental efforts to dispose of an "alien" species shape both our understandings of responsible urban citizenship and our knowledge of urban natures.

The material here is based on fieldwork in 2011, 2013, and 2014 in Dalian city, a large port and metropolitan region in northeast China with a population of over six million. It draws on participant observation with a large environmental NGO (ENGO) that has multiple projects for cleaning marine areas, educating people about leading low carbon lives, and addressing foreign invasive species. Fieldwork also included interviews with other urban residents about these issues.

In addition to participating in the invasive species activities, I accompanied this organization on another project in 2014. This was a campaign to reduce air pollution by convincing drivers to volunteer to stay off of the roads one day every ten days. According to the last digit of their license plate number, for example "5," the drivers would commit to taking public or other transit on the fifth, the fifteenth, and the twenty-fifth of every month. When I attended an event promoting this campaign in a shopping area parking lot hosted by the organization, the volunteers approached drivers when they exited their cars and told them about the project (see figure 7.2). Most were quite willing and thought it was an important thing to do since air pollution was such a serious health and environmental problem. In such a campaign, nature was there, but it was not healthy, they knew it, and it was through these citizen-to-citizen interactions, supported by the city government, but led by this social organization, that environmental health and well-being would be addressed. Nature—and here specifically the air—was a site of citizen-led regulatory intervention.

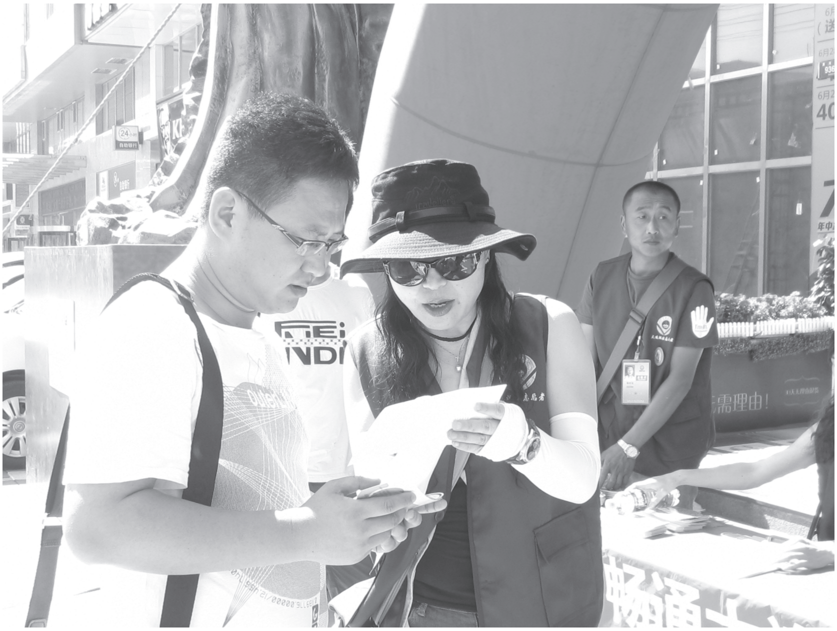

Figure 7.2
An environmental volunteer (*center*) approaches a driver about limiting his vehicle use to help reduce air pollution. Photo by Lisa Hoffman.

As argued in this chapter, it is notable that these efforts were led by a society-based NGO and not the city government, even as it worked with the city on various projects, and the leader of this organization was a former government official. Such collaborations and citizen mobilizations signify important shifts in the way urban governance in China is enacted. While such activation of society and individual participants is specific to contemporary China, these efforts also highlight the place of urban natures in negotiating shifting governmental relations more broadly. Thus, within this volume's project of comparative urban environmentalism, this chapter also argues that the case of environmental volunteering in China offers the opportunity to think not only about new governmental rationalities, which include the promotion of nongovernmental/social organizations and citizen volunteering, but also about what is at stake in terms of the mutual constitution of "urban natures" and "sustainable citizens" in the process. In a rapidly changing and increasingly urbanized and worlding China, such analysis demonstrates the role that urban natures play in the quotidian coconstitution of state and society. To lead us into this analysis, I will begin with a brief overview of contemporary practices of citizen mobilization in China.

Citizen Mobilizations

Volunteering with NGOs in spaces previously dominated by state management—such as poverty relief, disaster assistance, and environmental work—has become increasingly common in contemporary China. This space of social action and citizen mobilization is critical in our world of cities. In China, it is a contemporary state of being that sits between ambitious plans to urbanize 250 million more people, political campaigns to build a harmonious society, and goals of realizing national rejeuvenation along with personal well-being (the so-called Chinese Dream), in all of which social stability and security are prominent themes. The nongovernmental organizations, known as social organizations (*shehui tuanti/shehui zuzhi*), and citizen-led (*minjian*) efforts broadly, have become increasingly important in these processes, especially in addressing social issues related to urbanization. This role is directly related to the formal recognition of social organizations by the government, encoded in a series of directives about how they should register and how volunteers should be organized. To be official, social organizations had to have a government sponsor and register through the Ministry of Civil Affairs,[1] although a 2016 law regarding charitable organizations allowed organizations to register directly with the ministry. Nevertheless, many do not register and instead either exist on the fringes of legality or register as enterprises.[2] The outings described above were organized by a local social organization that was registered formally and often liaised and collaborated with the government—what may be called a GONGO, a government organized nongovernmental organization at the time of fieldwork. It received government funding (the director's salary was paid by the city government), but the organization's work was done by volunteers and was supported primarily through member dues.

While citizens understand the notion of social responsibility and active participation in organized activities (*huodong*) through reference points in Maoist socialism as well as Confucian ethics and even Christianity, the fact that these are charitable activities (*cishan huodong*) is important. An official desire for citizens to "voluntarily" step up and participate in a range of issues, to help strangers and in cross-class relationships, and to donate their private time and resources to the public good make these modes of social activity qualitatively distinct in the contemporary moment. “I don’t do this because the government told me to,” one regular volunteer explained to me. “This is all voluntary and spontaneous (*zifa*).” The outpouring of volunteer efforts after the 2008 earthquake in Sichuan Province also must be noted as significant in the popularization of volunteering, with some estimating that as many as three million people volunteered in some manner at that time, many for the first time.[3] Moreover, following the earthquake, the central government passed regulations that recognized the importance of social organizations’ efforts, particularly in disaster relief, and published a white paper suggesting “that the government should strengthen ‘social mobilization mechanisms’ in order to ‘give full play to the functions of non-governmental organizations and organizations at the grassroots level as well as volunteers in the sphere of disaster relief.’”[4] Such declarations further opened up the space for social organizations, and more specifically, for new kinds of *collaborations* (as opposed to conflicts) between government agencies, nongovernmental entities, and individual citizens, and thereby shaped subjectivity as well.[5]

Although much volunteer activity involves helping those in need, a particularly active sector of citizen volunteering focuses on environmental protection (*huanbao*). This kind of activity has been accepted by many, in both rural and urban areas, as reasonable in contemporary China. In Dalian, like other major urban centers, people can participate in volunteer efforts aimed at the environment in numerous ways. There are, for instance, regular trash pick-up, weeding, and educational opportunities, all of which may be organized by social organizations, residential developments, community (*shequ*) administrations, or university students.[6]

In addition, a white paper on human rights published in 2012 by the central government included, for the first time, a full chapter on environmental protection, which covered the importance of air pollution, sewage systems, and the right to enjoy a “healthy environment.”[7] This formal attention to environmental problems is linked with the production of knowledge about the “environment” as a site of governmental intervention,[8] with national development discourses, and with an increase in the number of citizen-initiated environmental groups, or ENGOs, which are defined as groups whose “primary goal is protecting the environment by either curbing pollution or protecting nature, or both."[9] One study conducted in 2008 indicated China had a total of 3,539 ENGOs, including those that were formally registered with the government, those that were citizen-based, and those that were embedded in schools.[10] While ENGO growth is related to serious environmental degradation resulting from new industrial processes and fulfillment of resource demands, public reactions to limited enforcement of existing regulations, and the advocacy of international environmental groups, it also has to do with a new attitude toward collective action that developed in the late 1980s and early 1990s. This attitude, what has been called "liberation" for environmentalists, occurred when the environmental leaders "became aware that collective action could improve the quality of the environment."[11] This awareness was supported by state-level decisions in 1996 that encouraged "public reporting on, and exposing of" environmental violations.[12] Moreover, it has been argued that the decentralization of decision-making to localities has in fact made it more difficult for the central government to manage environmental issues. Support for nongovernmental actors is then a way for "non-state actors to carry some of the environmental protection burden."[13]

A focus on the environment and nature have thus created distinct spaces of governmental intervention that in our contemporary moment rely both on direct state policy and regulation and, significantly, on citizen mobilization and social organization efforts. These mobilization efforts are embedded in the globally prominent "ecological framework" and fit well with China's specific concern for population and national quality development (*suzhi*), which "focus[es] on the ways that external conditions impede or foster human development."[14] The ecological framework, as Hsu has argued, "taught that each person's 'quality of life' was shaped by the 'quality' of his or her local environment."[15] Hubbert, moreover, has underscored that the embrace of environmentalism in China is often equated with being modern and educated, signifying higher *suzhi* levels.[16]

In summary, we may understand the formal acceptance of social organizations, including ENGOs, and support for their efforts (in politically acceptable realms) as new governmental technologies. All sectors recognize that with economic reforms, global trade, and more recent campaigns to urbanize the population, China faces new kinds of social and environmental problems that require new ways of doing things. Methods of centralized planning and distribution from the high socialist era were no longer feasible or effective; the government thus called on other sectors, such as society and the market, to do their share. These ways of doing things—by volunteers and social organizations and through citizen-led efforts—may be understood as specific solutions to contemporary governmental problems, which, when brought together in more stabilized patterns, may be called "strategic assemblages"—a term used to explain how "groupings of heterogeneous elements" may come together in a more stable way and be "deployed for specific purposes at a particular historical conjuncture."[17] In this case, we see a rapidly urbanizing country that is also undergoing governmental shifts from high socialist central planning and authority to more diverse governmental technologies, such as the use of social organizations, individual citizen mobilization, and even market incentives to address specific problems of pollution and invasive plants, as well as poverty and human suffering. Volunteering and NGOs, in other words, help to release social anxieties about ecological, social, and health concerns.

Greening Campaigns and Species Invasion

Dalian is an interesting site for investigating environmental volunteering and the ways such social practices and relations help produce urban natures. The city is known as a clean and green city, and under the leadership of Mayor Bo Xilai (1993–2000) it undertook an official greening campaign and marketed itself, and has been recognized domestically and internationally, as an environmental model city. Two volunteer events I described above, however, both targeted the now invasive *Sicyos angulatus*, also known as the burr or star cucumber (*ciguogua*).[18] It is an annual vine that winds around the native plants and trees in China. It is native to the eastern United States and in some parts of the country it is identified as invasive. While much transfer of invasive species happens through regular international trade, and Dalian is a major port city, the volunteers I met linked the arrival of *ciguogua* with the urban greening policies of the early 2000s. Importing plant materials for greening projects is a fairly common strategy in cities across China and has led some scholars to argue that "China needs to fully utilize its substantial native phytodiversity…in the creation of urban green spaces" precisely to avoid "plant invasions."[19] In 2005 the volunteers said they saw some indications of the invasive character of *ciguogua*, but it was not so serious. Between 2006 and 2008 it became a larger issue and was identified in multiple locations, making these plant eradication projects one of the major issues for the social organization. Paralleling this process and increasing global trade overall is the "exponentially growing number" of scientific studies in China on invasive species, which underscores a broad recognition of the issues across the country according to one study,[20] while another states that "China's biodiversity is threatened by the invasion of alien species, due to the expansion of global trade and international transport and tourism."[21] In addition, as the middle class grows and has more funds to supply its own landscapes, more "exotics" have been imported, further supporting the argument that China urgently needs public education campaigns on the "great economic and environmental risks posed by invasive plants."[22]

Dalian has also made headlines for other forms of environmental "public participation,"[23] including large anti-pollution protests that led to the (temporary) closing of a major factory using toxic chemicals,[24] and regular critique by citizens of the extensive coastal land reclamation for development. Marching against the chemicals, driving less, and uprooting invasive plants on weekends are framed by participants both in terms of individual health and in terms of landscape beauty, which, in turn, is closely linked with tourism and economic development. Those involved in environmental issues in the city expressed the sense that while the municipal government was interested in being a green city, it neither paid attention to these kinds of secondary consequences, nor was it developing long-term sustainable practices. Participation with social organizations thus not only linked government responsibility and individual citizen mobilization in new ways, but volunteering for the environment also connected people with other actants—such as "invasive" species—in new ways as well.

The notion of invasion is important for understanding the way people relate to nature around them for it implies some kind of harm or disturbance—underscored in the phrase "invasive alien species." The volunteers emphasized that this vine was not in its correct place and thus was not in harmony with its surroundings, but that it was indeed native somewhere. In contrast to experiences of the "invasion" of indigenous vegetation by "alien" species in post-apartheid South Africa in terms of "civic terror and moral alarm,"[25] in Dalian it is more about the correct or incorrect place for a plant and less about a general commentary on the state of the moral order of the nation. An environmental activist explained, for instance, that some new species are introduced without a problem: "But there are others that impact the local ecosystem. You can see these plants killing our plants." Introduction of new species did not necessarily mean invasion and destabilization of the local conditions. To him it was about understanding the correct and harmonious place for these species, and how, when they are moved somewhere else, they may become a problem. This did not mean, however, that they were inherently problematic. Rather, it was *the relation and not the object* that was problematic. Nature in the city, then, may emerge in contested and complex ways, intersecting other governmental rationalities and categories of health, beauty, progress, quality life, economic development, social responsibility, and foreign invasion.[26]

Such complexity and understandings of urban natures were apparent in interviews with participants in the invasive weed pulling event I attended in 2011. The volunteers ranged in age from high school students to those who had retired. Their explanations for why they were participating in the activity on a Saturday referenced the key governmental categories of health, beauty, conservation, and economic and population development. Comments from participants included: "If I can help society and help others, then I am happy"; "Dalian is a pretty coastal city and the environment is important. Dalian citizens should do something to keep the city beautiful"; "I do many of these activities. Every Saturday there is trash pick-up at local parks, and I am active in a group that helps protect land because there is less and less agricultural space"; and "We have to use these opportunities to talk about how economic development and the environment are related." One high school student explained that his school did not have an environmental group, so he came to this organization. After training at the organization for two to three hours, he and several classmates came to participate. "The water used to be clean," he said by way of explanation, "but now the pollution in the sea is very serious." Notions of the city beautiful, a green and clean environment, and citizen responsibility merge in these practices. Caring for the environment in the contemporary moment was considered an appropriate way to show one's concern for the public good and to express one's social responsibility. It also hinged on the intersection of humans and plants, as in the physical work of the eradication efforts. Participation was polysemous—incorporating modernity, the good life, citizen responsibility, and nature in harmony.

One man brought his son and explained that he volunteered because he believed environmental safety was important. He had been volunteering with this group for many years, which he justified in terms of the city's history. Dalian was known for its oil and chemical production, which, he explained, had produced many serious environmental issues. Yet his understanding of the role of the individual—and his or her family—highlights the expanded notion of citizen action. "There are many things the government cannot do, so the people must do it with their own abilities," he explained. "Some things the government must do, and individuals cannot do, such as policies. But we need to be responsible for the environment for many years, not just one year. I feel this is the responsibility of society. The government won't necessarily care for this, so we must do these things." His son chimed in, saying that "this is our home and our responsibility. We should do it ourselves."[27] Reinforcing the idea that ordinary volunteers could have an impact, an environmental leader noted that volunteers were particularly useful because "they are the common people [*laobaixing*] and can do things that the government cannot do." He elaborated that volunteers did work that "the government in fact wants done" and that this shaped the "relations between the volunteers and the government."

Of note, this father-son pair also was connected with a large group (sevety-nine people) of volunteers from a state-owned company located outside of the central city in the Economic and Technical Development Zone. This company required its workers to participate in some kind of charitable activity (*cishan huodong*)—a particularly contemporary understanding of volunteer work and exhibition of one's social responsibility. All of the lower-level managers (and party members) in the finance department from the father's company were participating that day, as well as the director. "The company is very busy," he said "but as a citizen of the city we should do this. . . . In the past we have cleaned up the garbage near our company, and this is the first time we have done an activity like this [with this ENGO]." Like other associations or workplaces, this state-owned unit brought red banners with the name of the unit written across it, echoing the displays and mobilization efforts and referencing symbols of collective action of the Cultural Revolution as well as the 1989 student movement.[28] It is also noteworthy that, when institutions such as this work-unit came to participate, they did so in the interests of "their city," known for its "natural beauty"—a local rather than national identity and concern with a more bourgeois aesthetic feature that would have been problematic in the high socialist era. One participant described this effort as a dual process of simultaneously "raising up" the level of the city and the level of the people. At the same time, their organized volunteer activity was a response to the lack of government attention. Public expressions of environmentalism may be understood as an acceptable way to show one's concern for the public good—a practice that brought disparate notions of social responsibility and organized work together. Other interviewees described volunteer work as a "supplement" to government projects in spaces the government was not able to manage fully. If someone had skills and the resources (that is, their own economic security), explained one volunteer, then it would be okay for him or her to participate in these activities.

The Making of Urban Natures

In these activities the site of intervention is understood as "nature"—to be saved, preserved, and made harmonious again. Protecting nature sits then at the intersection of new social spaces and practices of community-based volunteering, even what we could call a "consciousness" of environmental protection in urban China, and a sense that some people have their own time (perhaps understood as leisure time) to participate in such activities. These intersections are reflective of the subjects and forms of governance emerging in urban China—shaping not only those who participate, but also the landscapes themselves as people label them healthy, polluted, natural, and/or urban. Hence, the constitution of "urban nature" as a field of action, knowledge about it, understandings of its health, and identification of interventions that will help it are intimately connected with the contemporary subjectivities and collectivities emerging to do the intervening. The mechanisms, practices, and norms that produced a field of governmental action also shaped the very subjects active in that arena. The production of urban natures, in other words, is necessarily linked with the emergence of environmental volunteers.

We should also consider what is at stake (materially, socially, politically) in the kinds of collectivities and socialities these processes produce. For instance, what socialities emerge through collective physical activity of cutting plants; the sharing of snacks, water, and time with other citizens; identifying something as out of place and dangerous (invasive); and engaging in communal unpaid, leisure weekend activities? In these eradication efforts, the plants are enrolled in these social processes such that plant/human actants emerge, potentially shaping the politics of volunteering in contemporary China. The state/nonstate spaces of social action in these volunteering efforts also matter, as such intermediary social spaces are indicative not only of citizen-subjects who volunteer responsibly, but also of changing relations between citizens and the state.[29] This case thus underscores that analyses of governing and governmental technologies should also include conversations about urban natures, and that urban natures may in fact be productive sites for understanding how governing produces fields of governmental action.

In addition to thinking about what is at stake in the collectives and subjectivities that enroll both humans and plants, this chapter also aims to make a conceptual contribution by thinking *through* and *across* categories that are typically conceptualized as distinct. Much work on NGOs in China asks, for instance, if China has a civil society, and if so, what degree of “autonomy” this space has from the government. Such research questions conceive of a split between state and society and understand agency to be embedded in particular, often opposed, social actors in each field (that is, either in the state or in society). As such, state and society are set up against each other, with power residing in one or the other, and autonomy conceptualized as a naturally existing state of being rather than a form of governing. Moreover, views built on this kind of universalizing, binary state-society split often assume a clear distinction between other foundational (Western) categorizations, like culture and nature, where nature is considered an a priori category that exists outside of human action yet can be protected, cleaned, weeded, and conserved, and culture is the human-created space of ritual, religion, art, and so on. Here, however, I wish to think across and through, rather than *about* such distinctions, and in terms of both/and rather than either/or, to understand better the way urban natures are socially formed.[30] In particular, this approach may help us understand what is at stake not only in the kinds of collectivities and subject forms we see, but also in notions of urban nature that view plants, albeit invasive species, as enrolled in human social action. Both the volunteering subjects who learned collectively about the invasive species, donned protective gloves, and used machetes and other tools to remove the plant, and the object of their intervention, a natural world being saved and put back into a more harmonious state, emerged in relation to profound urbanization trends and governmental shifts.

Environmental volunteering did not just appear in China in response to identifiable environmental problems in the city,[31] or with the emergence of a civil society, in other words. Rather, such practices materialized alongside changing relations between subjects and the state, relations that are embedded in complex assemblages and networks of subjects, things, and political rationalities, including the work unit participants, plants identified as out of harmony and thus invasive, and discourses of citizen responsibility. These assemblages may be understood, as Marcus and Saka argue, as the "result of the intersection of two open systems," such as humans and nature. This means that the social form of urban nature unfolding in this instance is "only discernible as a result of the intersection of both such systems."[32] A grounded approach thus highlights the enrollment of invasive plants into social worlds, the bent backs of weeding, volunteer participants, nongovernmental/social organizations, and even global politics of trade, exchange, and migration. The intersection of open systems, and the way various entities are pulled into the practice of environmental volunteering also encourages us to "rethink" how agency itself may be "distributed" across systems of humans and things, such that the *ciguogua* plant and volunteer coexist and even share agency across them.[33] Thinking *through* intersections—rather than thinking in terms of an either/or—offers a way to conceive of plants, people, government directives, and nongovernmental entities together in the constitution of nature and natural spaces in Dalian.[34]

This invasive plant, out of sync with the local environment, is enrolled in, and thus a part of, father-son participation in plant-pulling activities, official greening campaigns that imported new species, government documents legalizing NGOs, efforts to increase the number of citizen volunteers in China, and transnational politics of invasion and national sovereignty. It is through all of these points of reference that the practice of volunteering for the environment becomes thinkable and commonplace for urban residents in China. In these activities, the site of intervention is understood as nature—to be saved, preserved, and made harmonious again. This space—nature in the urban, local ecosystems—is threatened by plants, plastics, and insects that are considered out of place and inharmonious. Such volunteer work is "something the citizens have to do," as one volunteer activity leader in Dalian explained. "The local government doesn't care about this yet." Thus, work units, schools, and individuals mobilize and find their own citizenship entangled with plants, building new communities and social networks in the city as well.

Conclusion

In conclusion, I wish to emphasize that shifting assemblages of state and nongovernmental actors, of invasive species and state regulations for registering social organizations, and of local volunteers and brochures advertising their city as beautiful, green, and modern do stabilize in more formalized approaches to governmental problems (such as those concerning economic development, urban planning, and environmental protection). These formalized approaches also shape objects of governmental intervention, such as "the environment" and its "well-being," as well as "urban natures" more specifically. The constitution of such a field of action is intimately connected with the emergence of those expected to intervene and be active, "voluntarily," in this domain. The government official who became the leader of the Dalian ENGO and the young man who sought out this organization because his school did not offer volunteering opportunities such as this may be identified as "responsible" citizens, part of the growing middle classes, and willing to take action in nongovernmental/social spaces. The mechanisms, practices, and norms that produce a field of governmental action thus shape the very subjects active in that arena. In Dalian, the production of urban natures, in other words, is necessarily linked with the emergence of environmental volunteers. In addition, the enrollment of plants into the social practice of volunteering suggests agency itself may be distributed across humans and plants, potentially shaping the politics of volunteering in contemporary China. Much then is at stake in *thinking across and through* categories and intersections, rather than using either/or approaches.

Thus, thinking about the *grounding of urban natures* has offered an opportunity to think more about what is at stake in the emergence of a world of cities where *urban spaces* are being reformulated as fields of governmental intervention and where wider social problems are identified, classified, and solved. More specifically, I grounded this analysis in Dalian, with a naturally deep and ice-free harbor, a beautiful coastline, a history of heavy industry, and a national and international reputation as a model environmental and green city, and in this contemporary moment when the state-society relationship in China is being reworked, cities are experiencing greater decentralization of authority, and citizens are being encouraged to be more independent, self-enterprising, and individually responsible after years of state centralized planning. The world of cities in which we all live, and the urban world being created at breakneck speed in China, is our laboratory for understanding power, politics, and how we come to be the people we are, in the spaces we inhabit.

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Notes

1. Friends of Nature, an environmental organization founded by Liang Congjie, was one of the first to register formally in 1994—as a "national level membership organization"—and now has thousands of members (Knup 1997, 12; Schwartz 2004, 39).

2. Lee 2009, 352; Shieh and Deng 2011. See also Knup (1997); Estes (1998); Ma (2002); Zhu (2005); Lee (2009); Simon (2013); and Hsu (2017). A 2016 law also restricted foreign NGO activities in the country.

3. Roney 2012, p. 88; Zhang 2012, p. 228.

4. Cited in Roney (2012, p. 85).

5. Hoffman 2013, 2015.

6. Many of the environmental groups in Shanghai, for instance, were started by university students and are not officially registered (Lee 2007).

profits. The glue of kinship holds this tight-knit network together: a number of leading politicians have immediate relatives in the real estate business.

It is this political economy of land transformation, extending from the village to the state's topmost leaders, that led in 2011 to the Draft Development Plan 2031 for Mangar, which zoned the area for commercial and residential use—a designation that is a death sentence for Mangarbani. From 1991, developers started using the Consolidation Act, a law meant to redress the fragmentation of agricultural fields and village commons, to accumulate land holdings in violation of the Haryana Ceiling on Land Holdings Act of 1972.[8] Since the holdings are *benami* (under assumed names), it is difficult to track and prosecute the actual owners. With the help of political leaders, corrupt revenue department officials, land brokers, and complicit villagers, Mangarbani is on the verge of going the same way as the rest of the Aravalli landscape—denuded, buried under concrete, its ancient forest gone forever.

One would think that it requires a sea change in values for villagers who have protected Mangarbani for centuries to now be willing to see it destroyed. But this change did not happen overnight. Quartzite quarrying in the Aravalli hills in Delhi, Haryana, and Rajasthan states accelerated when Delhi underwent a construction boom before the Asian Games 1982, and struck deeper and wider to meet demand over next two decades as the NCR witnessed unprecedented growth. Some quarries were on private lands, but most were on village commons, and *panchayat* (village council) leaders were quick to seize the chance to make money, even though farmers reported that the blasting of rocks and their removal was causing groundwater to become scarce. In places, the landscape was visibly altered as entire chunks of tall hills disappeared over the course of months. It was only in 2002 that, acting on a public interest petition, the Supreme Court of India ordered a ban on mining in the entire Aravalli range. However, by this time, farming in this semi-arid terrain was already dwindling as a remunerative livelihood. Once the money from mining stopped coming in, villagers were left high and dry and altogether willing to consider other options for their land. The Mangarbani forest, however, remained intact over the last three decades even as the surrounding landscape and people's relationships to land were changing rapidly.

What tipped the scales against the collective protection of Mangarbani as a sacred grove was the tide of real estate development sweeping in from Gurgaon and Faridabad, two "satellite towns" planned as magnets to

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7. Ali 2013.

8. The "natural" environment has been targeted as a site of governmental intervention through market logics, mechanisms that measure and quantify, and through the decentralization of decision-making to local authorities. Consequently, sustainable city-building has been mobilized as a new source of value and field of action, producing particular kinds of city spaces and shaping the conditions of possibility for place-making (Hoffman 2009).

9. Ru and Ortolano 2009, p. 149.

10. Kang 2018.

11. Ru and Ortolano 2009, p. 155.

12. Schwartz 2004, p. 35.

13. Ibid., p. 28.

14. Hsu 2017, p. 125. Carolyn Hsu (2017) argues that not only did *suzhi* discourses and ideologies of personal and population improvement align well with the global ecological framework, but also that the environmental activism that arose in China suggests the emergence of a new mode of citizenship: social entrepreneurship.

15. Hsu 2017, p. 128.

16. Hubbert 2014.

17. Rabinow and Rose 1994, p. xvi; Ong and Collier 2004.

18. See Zhang and Han (1997), Zhang et al. (2007), Ou et al. (2010), and Xu et al. (2012).

19. Axmacher and Sang 2013.

20. Liu et al. 2012.

21. Zhao 2005.

22. Axmacher and Sang 2013; see also Liu and Diamond (2005).

23. See Martens (2006).

24. BBC 2011.

25. See Comaroff and Comaroff (2001, p. 630).

26. See also Hubbert (2014).

27. Several surveys indicate that environmental awareness is limited in urban China. For instance, a survey from 2006 in Shanghai found that while people had strong "environmental attitudes," the "environmental knowledge" was weak. In questions about the impact of heavy metals and batteries, 18 percent were aware of the

impact and 34 percent "were entirely unaware of such a hazard" (Lee 2007, p. 287). See also Hubbert (2014).

28. Esherick and Wasserstrom 1990.

29. Hoffman 2015.

30. Allan Pred's (1995, 2000) work on situated practices is helpful in thinking in nonbinary ways. See also Merrill (2015) on the use of Pred's both/and approach, and Merrill and Hoffman (2015) on Pred's contributions, particularly how situated analyses help to make that which is taken for granted visible.

31. Ru and Ortolano (2009) examine the marked increase in the number of "citizen-organized environmental nongovernmental organizations (ENGOs)" since the 1990s.

32. Marcus and Saka 2006, p. 103.

33. Ernstson 2013.

34. See Ong (2004) on incorporating multiple actors, norms, and institutions into understandings of space-making. See also Dierwechter (2004) on thinking about urban planning across scales and domains.

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the Northern Ridge for recreational use has squeezed out the native flora and fauna; jackals, hares, and monitor lizards have now disappeared. Poor people who collect firewood and grass find it much harder to do so; vigilant middle-class walkers and patrolling *chaukidars* are quick to pounce on them. The Ridge is now closed off from its past use as an urban common that provisioned those who lived by the sweat of their brow; they have been replaced by those who sweat in order to keep their bodies fit. Yet the concerns of the laboring classes have not figured in the debate over urban conservation.

In other parts of the city, the conflict over urban nature has been even more violent. Early one morning in January 1995, residents of the well-to-do neighborhood of Ashok Vihar caught and beat young Dilip to death for defecating in the open area that they regarded as their 'park.'[41] The opposition between different views of urban nature and its commons could not be starker. Dilip was from an adjoining *jhuggi basti* (squatter settlement), where more than ten thousand households had only twenty-four latrines between them, forcing people to use any open space, under cover of dark, as a place to defecate. The more affluent residents of the area tried to discourage this practice by building a wall between the dirty, unsightly *jhuggis* and their own homes, but the wall was soon broken to allow the daily traffic of domestic workers who lived in the *jhuggis* but worked to clean the homes and cars of the rich, as well as the nighttime passage of clandestine defecators. Dilip's death was thus the culmination of a long-standing battle over a contested space that, to one set of residents embodied their sense of gracious urban living, a place of trees and grass devoted to leisure and recreation, and that to another set of residents, was the only available space that could be used as a toilet. When a group of people from the *jhuggis* gathered to protest against this killing, the police opened fire and killed four more people.[42]

The social geography of urban nature in Delhi is a deeply riven, shifting landscape. As the villagers of Mangarbani showed by their alacrity in selling their share of the sacred forest, green spaces can become taken for granted and traded for more tangible gains. Yet other social groups have intervened to evoke a sense of loss and a renewed appreciation of the forest, leading to a new determination to save it from developers. The domesticated sections of the Delhi Ridge now accommodate morning walkers and trysting couples, members of the middle-aged middle classes and their subversive offspring. And, at the same time, for a handful of people, the park opened up a path

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8 Urban Nature and Its Publics: Shades of Green in the Remaking of Delhi

Amita Baviskar

Nothing prepares you for the first view of Mangarbani. There's the Gurgaon-Faridabad toll road, your standard highway on Delhi's outskirts, rolling through a landscape where dusty scrub vegetation is being rapidly replaced by dustier high-rise construction sites. There's an eyesore called the Gurgaon Faridabad Combined Solid Waste Management facility, with acres of open garbage, some scrawny cows, and flapping crows. Beside the *kachcha* (unpaved) road along the dump's broken boundary wall, there are deep, jagged-edged craters, relicts from the stone quarrying that was done here until ten years ago. The land is rocky and open, dotted about with trees and shrubs, one of those ennui-inducing views where your mind begins to wander to more interesting things like the grocery shopping list or reminding yourself to call the plumber when you get home.

In the middle of this nowhere, Pradip Krishen, author of *Trees of Delhi*,[1] whom I am accompanying, stops the car. We walk for about ten minutes, winding our way past rocks hugged by stunted plants, between trees twisted by hot dry winds. It is 8:00 in the morning in late March, and it already feels like summer. And then, suddenly, we arrive at the lip of a cliff. The ground drops away and so does my jaw. Spread out below us is a deep wooded valley, densely yet delicately green, the expanse of its tree canopy broken only by the whitewashed domed tower of a small shrine in the distance. Besides the shrine, the only other sign of human presence is a boundary pillar on the far end of the valley. That's it; the rest is undisturbed forest. The only sound is the plaintive call of peafowl, the only movement their ponderous glide from one tree to another. Oh, there's also the racket of parakeets arrowing across the sky. Some grasses wave as the breeze catches the outcrop of rocks below our feet. Everything else is still. We could be two hundred kilometers away in the middle of Sariska National Park except that we are not. We're in Delhi National Capital Region (NCR), twenty minutes away from the wall-to-wall carpeting of tarmac-glass-concrete-stone, twenty minutes from traffic jams, crowds, noise, dust, and smoke. Yet it feels like we have landed on a different planet.

By weaving two interrelated narratives of urban natures—Mangarbani, where we started, a sacred grove on the periphery of the metropolis that faces conversion into real estate, and the Delhi Ridge, a natural and naturalized "wilderness" that has been domesticated for recreational use—this chapter addresses the cultural politics of urban nature. It focuses on how green spaces and urban publics are mutually constituted in Delhi, India. It delineates the social transformations through which the cultural meanings that inhere in urban natures are reimagined, and the ecological transformations that give rise to new social relations around the use and protection of green spaces. In particular, the chapter shows how the move to create and preserve specific forms of urban nature can be closely related to the rise of a middle class that has consolidated its power in the period of economic liberalization since the 1990s and has appointed itself as the vanguard of public environmental causes. However, instead of improving the urban environment for all citizens, this "bourgeois environmentalism" has had far-reaching adverse ecological and social effects. Moreover, the urban order that middle-class environmentalists seek to impose does not go unchallenged, but is undermined by other users of public green areas, ranging from poor migrant workers foraging for firewood to young lovers seeking anonymity. After foraging in Mangarbani and visiting the Delhi Ridge, the chapter closes by showing that, although the meanings and practices around urban natures are contested, they also give rise to new alliances and understandings that are mutually fruitful.

Mangarbani

What's so special about Mangarbani? It's not as if Delhi lacks large green spaces. Besides numerous parks and gardens, there is the densely wooded expanse of the Ridge, the northern-most spur of the Aravalli range which stretches all the way to Rajasthan. However, from the ecological point of view, the Ridge is seriously compromised. A lot of it has been spruced up for human use, the undergrowth cleared and exotic species planted. Among these imports, the most pernicious has been Central American mesquite (*vilayati keekar,* or *Prosopis juliflora*), which has established itself by suppressing indigenous plant species and the life forms they support.[2] Because it is hardy and propagates easily, *P. juliflora* has been a favorite of forest departments looking for a quick-fix for greening India since colonial times. So in most large green areas in Delhi and its environs today, *P. juliflora* dominates over native species, to the detriment of local biodiversity.

Mangarbani has managed to remain remarkably free of the *vilayati keekar* curse. Even more miraculous, it has undergone virtually *no* human interference or exploitation for several hundred years. The surrounding villages have protected the grove as sacred to the memory of Gudariya Baba, a hermit whose shrine stands at the base of the valley. They believe that anyone who cuts wood or grazes their animals in this one-hundred-hectare forest invites the Baba's wrath and retribution. So Mangarbani stands out in the Delhi region for being an unspoiled old growth forest of a kind unique to the Aravalli range, a startling vision of what these ancient hills would look like if they were protected from biotic pressure.

And what a vision it is! The top of the valley and its steep sides are thickly covered with *dhau*, a medium-sized tree with pretty leaves that go from pale green to purple brown (see figure 8.1). Such a profusion of *dhau* is typical of the climax vegetation of some tropical dry deciduous forests. According to Krishen, whose *Trees of Delhi* brought Mangarbani to the notice of a wider public, the tree used to be found all over the Ridge but now is in danger of disappearing in Delhi. Two other beautiful trees that grew in the forests that have vanished from the Ridge—*kala siris* and *salai* with its fragrant resin—survive only in Mangarbani in the Delhi region. The valley includes some dry and sandy patches where plants typical of arid regions—trees like *kareel* (the *kair* of the famous Rajasthani vegetable dish *kair-sangri*) and *roheda* with its flamboyant orange flowers—can be found. The moist valley floor is shadowed by tall *kaim*—the original *kadamba* of Krishna's Vrindavan[3]—and *kanju* with its fruit encased in translucent papery discs. Along with these are the more common trees of the Ridge: *ronjh*, *bistendu*, *hingot*, and *doodhi*. During the spring, *doodhi ki bel* is laden with sweet-smelling creamy flowers; its perfume escorts us down to Gudariya Baba's shrine.[4]

On the path to the shrine is a nasty surprise. There is a temple, a large building with a courtyard and pond, which is being expanded to double its size. The land has already been cleared of its vegetation. The temple is the site of an annual fair and other religious events, and the crowds that

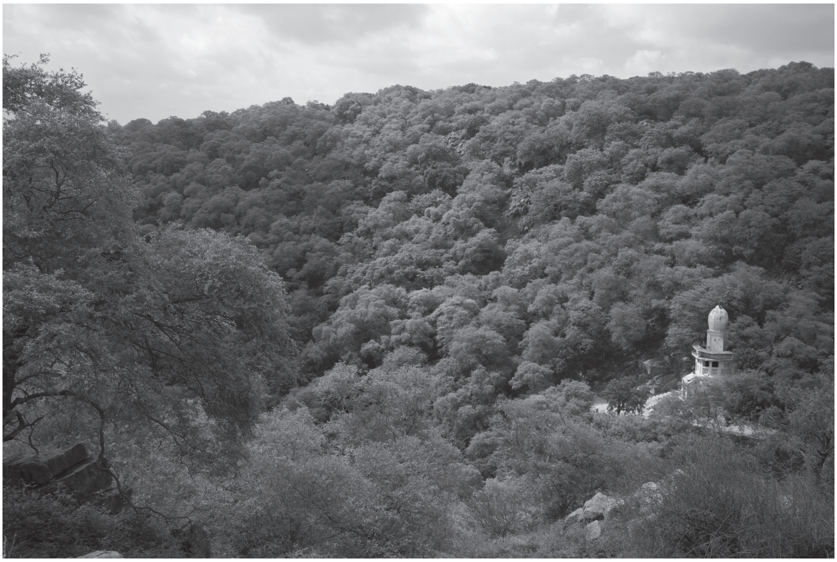

Figure 8.1
Mangarbani's *dhau* forest with Gudariya Baba's shrine. Photo by Pradip Krishen.

descended on it most recently have left behind smelly heaps of dirty Styrofoam plates. Although the temple's growing precincts pose a problem in this pristine area, there is an even bigger issue at stake, one that threatens the very existence of Mangarbani.

Mangarbani and its surrounding land used to be the *shamilat deh* (commons) of Mangar, Bandhwari, and Baliawas villages,[5] settlements dominated by the Gujjar caste, with about three thousand landowning households. Since precolonial times, the *malikan deh* (proprietary body of a village), which consisted of all landowning households represented through village *panchayats* (local councils), controlled these forests, grazing lands, and ponds. In revenue records, the commons were classified as *ghair mumkin zameen* (uncultivable land) and therefore exempt from agricultural tax. Landless households in the village belonging to the Scheduled Castes (former Untouchable castes who cleaned and disposed of human waste and animal carcasses) had rights to collect firewood and fodder from these commons only at the pleasure of their upper-caste landowning patrons, as did agricultural tenants. In the late 1970s, the governments of Haryana and Uttar Pradesh states and the Union Territory of Delhi began carving out plots of the land in the commons to give to landless Scheduled Caste households for cultivation. This was ostensibly a relatively painless program of “land reforms” since it did not expropriate any cultivatable land from existing landowners, but only allocated a portion of their shared “uncultivatable” commons. However, the landowners were not willing to allow even this limited curtailment of their rights and managed to successfully block it.[6]

Fearing that the government would try again to wrest control of their commons, landowning villagers across Haryana state mobilized politically to get the Punjab Village Common Lands Regulation Act of 1961 amended. From being collectively owned by the village *panchayat*, the commons were partitioned such that individual owners of agricultural land received titles to common lands in proportion to the size of their private holdings. This partition remained notional until 1986, when individual claims were demarcated on the ground. This privatization of the commons facilitated their commodification. Several villagers sold their titles to real estate developers and speculators who have fenced and walled in their plots, preparatory to clearing and building on them. This activity is so far confined to the area surrounding Mangarbani but may soon encroach into the forest if the real estate lobby in the Haryana government has its way. Many individual titles have been sold and resold to a “powerful business- politico- bureaucratic-police nexus with ostensibly no interest in agricultural activities.”[7]

The actors who collaborate in this nexus include influential local men who persuade their fellow villagers to sell their land; some of them have set up small offices along the main road advertising their business as property brokers. They receive financial backing and enforcement muscle from local politicians who bribe and intimidate lower-level officials to legitimize and expedite transactions. Bigger real estate firms either buy land through these brokers or appoint them as their agents on the ground, getting capital from investors who include not only people seeking homes and offices for their own use, but also speculators looking to gain from the rise in property prices. Corrupt politicians and bureaucrats are an essential part of this real estate economy. As owners of huge unaccounted wealth, real estate—with its large gap between the declared and actual value of property and its undocumented cash transactions—is a convenient way to invest black money. Bureaucrats and politicians help developers negotiate the regulatory hurdles required to secure building permissions, in return for a share in the profits. The glue of kinship holds this tight-knit network together: a number of leading politicians have immediate relatives in the real estate business.

It is this political economy of land transformation, extending from the village to the state's topmost leaders, that led in 2011 to the Draft Development Plan 2031 for Mangar, which zoned the area for commercial and residential use—a designation that is a death sentence for Mangarbani. From 1991, developers started using the Consolidation Act, a law meant to redress the fragmentation of agricultural fields and village commons, to accumulate land holdings in violation of the Haryana Ceiling on Land Holdings Act of 1972.[8] Since the holdings are *benami* (under assumed names), it is difficult to track and prosecute the actual owners. With the help of political leaders, corrupt revenue department officials, land brokers, and complicit villagers, Mangarbani is on the verge of going the same way as the rest of the Aravalli landscape—denuded, buried under concrete, its ancient forest gone forever.

One would think that it requires a sea change in values for villagers who have protected Mangarbani for centuries to now be willing to see it destroyed. But this change did not happen overnight. Quartzite quarrying in the Aravalli hills in Delhi, Haryana, and Rajasthan states accelerated when Delhi underwent a construction boom before the Asian Games 1982, and struck deeper and wider to meet demand over next two decades as the NCR witnessed unprecedented growth. Some quarries were on private lands, but most were on village commons, and *panchayat* (village council) leaders were quick to seize the chance to make money, even though farmers reported that the blasting of rocks and their removal was causing groundwater to become scarce. In places, the landscape was visibly altered as entire chunks of tall hills disappeared over the course of months. It was only in 2002 that, acting on a public interest petition, the Supreme Court of India ordered a ban on mining in the entire Aravalli range. However, by this time, farming in this semi-arid terrain was already dwindling as a remunerative livelihood. Once the money from mining stopped coming in, villagers were left high and dry and altogether willing to consider other options for their land. The Mangarbani forest, however, remained intact over the last three decades even as the surrounding landscape and people's relationships to land were changing rapidly.

What tipped the scales against the collective protection of Mangarbani as a sacred grove was the tide of real estate development sweeping in from Gurgaon and Faridabad, two "satellite towns" planned as magnets to reduce congestion in Delhi, which afforded real estate developers favorable terms since they were not hampered by the Urban Land Ceiling Act, which prohibited private firms from undertaking large-scale projects in the capital city. Selling to developers made landowners cash rich beyond their imagination; farming was a subsistence activity at best, so villagers were only too willing to give it up in exchange for substantial sums of money. The value of land in the area around Mangarbani remained low until about 2010, when the road connecting Gurgaon and Faridabad began to be upgraded in anticipation of the eventual merging of the boundaries of these two expanding cities. The villagers in this area who sold their lands, including their claim to the Mangarbani forest, were doing only what most of Haryana's villagers have done or are waiting to do.[9]

But what of the religious significance of Mangarbani? How could Gudariya Baba's prohibition be defied? When asked about this, some villagers reiterated their commitment to him. *"Baba ne kahaa ki yahaan koi lakdi nahin kaatega, pashu nahin charayega. Hum barson se unke kahe ko maante aa rahen hain"* [Baba said that no one will cut wood or graze animals here. We have been abiding by his words for ages], said Jairam Harsana of Mangar village. He also described what happened to those who violated the Baba's injunction: their livestock died; their wooden houses burst into flame. But by selling his title to the forest he is at a remove from these acts of retribution since he will not be the one doing the actual cutting of trees. He has regrets, though, about selling the sacred grove and, in 2011, signed a petition along with other elderly villagers asking the government to protect the forest. When asked how that would affect the rights of those who had purchased the titles to Mangarbani's land intending to develop it, he expressed his helplessness: "It was thirty years ago. We didn't know. It was only on paper. No one knew who owned which piece of land. We didn't think it would come to this."

If there is regret in some quarters about losing the forest, other villagers seem to be taking Gudariya Baba's legacy in a different direction altogether. Near the Baba's simple whitewashed shrine is a newly built temple, painted stand-out saffron and all set to expand its precincts, adding more area and deities to the Shiva-led pantheon currently installed for worship. With the temple attracting more devotees and visitors, Mangarbani's spiritual center seems to be shifting away from Gudariya Baba to the standard Hindu multigod multipurpose buffet and bringing a commercial element that was earlier absent from the forest. The temple is both a salve to the conscience that rues selling out the Baba—*"Hum is dharmik sthal ko sudhaar rahein hain"* [We are improving this religious place]—and a sign that the Baba's spirit may soon be superseded by the all-too-familiar process of temple-led land grab.[10]

Perhaps a clearer consensus about protecting Mangarbani would have been more likely if the forest had remained a common. If individual titles had not been allotted to landowners, it would have been harder to sell the undivided land. But this is speculation. What is evident is that although the village no longer functions as a collective body in deciding the fate of the forest, another collective entity has stepped into the picture to save Mangarbani. A group of environmentalists, most of them upper-middle-class residents of Gurgaon, who have an interest in water conservation,[11] started a campaign to save Mangarbani by publicizing its ecological richness and by pressurizing the government to fulfil its environmental mandate. The campaigners point out that any attempt to change land use in Mangarbani is in clear violation of a 1996 Supreme Court order that, regardless of ownership, such densely wooded areas be legally designated as forests and protected accordingly. They argue that the Draft Development Plan of Mangar, which zones the area for residential and commercial use, should be scrapped. The campaign has received favorable media coverage and, in January 2013, succeeded in getting the National Green Tribunal to order the Haryana government to stop all nonforest activities in the forests around Mangar village.[12] In May 2014, it received a further boost when the NCR Planning Board decided that 250 hectares in Mangarbani, as well as a 500-meter buffer radius around the forest, would be earmarked as a "no-construction zone."[13] This addresses the campaigners' demand that about 500 hectares around the forest should be regulated as a buffer zone with restricted activities and, especially, that construction and water-intensive land use be banned. The area forms the watershed of a seasonal stream that runs through Mangarbani and helps create its distinctive habitat, while also recharging groundwater in the area and supplying water to nearby Dhauj Lake. Haryana state has already done plenty to deplete its scarce water sources; destroying this particular catchment would be another act of development folly.

Most of the buffer has scattered and stunted trees that are indigenous to the Aravalli hills. Although *P. juliflora* has spread here, *dhau*, *ronjh*, the flame-flowered *palash*, blazing yellow-flowered *amaltas* and other natives still predominate.[14] Conservationists argue that there is great potential for restoring the original forest that existed here, for giving the *nilgai* (*Boselaphus tragocamelus*) and jackals an undivided landscape to roam, and for recreating a habitat for indigenous flora and fauna in a geologically dramatic setting. They would like Mangarbani to be integrated as part of a continuous biodiversity corridor in the Aravalli hills, stretching from Asola Wildlife Sanctuary in Delhi to Kot in Rajasthan. The campaign demands that the Haryana government not only comply with the Supreme Court and National Green Tribunal's orders but also take the initiative to protect the larger landscape of which Mangarbani is part. However, given the state government's complicity in shady real estate development deals, it seems unlikely that it will sort out and settle property rights in the area and make villagers partners in future conservation. Only continued pressure from the conservationists, working through the courts and media, may compel the government to protect Mangarbani.

Although Mangarbani is in some ways a special case in being a sacred grove on the periphery of a modern metropolis, it highlights some significant processes at work in how urban India acquires or loses green spaces, as well as the political economy of land ownership and use. It also delineates the social transformations through which the cultural meanings that inhere in green spaces are reconfigured. The Mangarbani forest came out of obscurity in the last decade because it was featured in a naturalist's handbook.[15] The weekend visitors it attracted were wilderness lovers, affluent residents of Delhi and Gurgaon, many of whom became homeowners thanks to real estate development facilitated by the "political-bureaucratic nexus" that took over village lands. Now that this process threatens Mangarbani, in an ironic twist, some beneficiaries of land commodification have turned "environmentalist," ranging themselves against the "builder Mafia" from whom they bought their luxury apartments and bungalows and seeking to protect a green space that is not only perceived to be ecologically valuable but also an enhancement of their quality of life. From a mutually advantageous relationship with builders, sections of the elite have shifted their allegiance to a new axis, aligning with the older generation of Mangar villagers.

Thus, even as the corporate identity and power of the village is broken down into individual fragments that hasten the commodification of land, another collective group constitutes itself as the guardian of the forest. The environmentalists do not replace the villagers, nor are they in conflict with them. In fact, it would seem that by talking to villagers about the biodiversity of the forest and reminding them that it is their protection that has sustained this grove over the centuries, the environmentalists hope to revive a collective sentiment that will enable them to fight together for the future of Mangarbani. Even as the Baba's spiritual hold on the villagers seems to be becoming more tenuous, environmentalists have stepped in with ecological arguments about respecting all life forms, the interconnectedness of trees, soil, water, and air, and living in harmony with nature—arguments that at times resemble the tenets of a secular religion.

The Delhi Ridge

The sensibility that underlies the environmentalists' efforts—their appreciation of Mangarbani as an original ecological place worthy of protection—is both modern and recent. Although many of the cities that flourished at the site of present-day Delhi over the last two millennia had established systems to harness water and to source timber and fuel from the hinterland, as well as having designated land use based on topography and soil, they did not set aside any area for its ecological importance. Delhi's two major natural features—the river Yamuna and the hilly Ridge—went virtually unregarded until the 1970s, even though they together defined the catchment that watered the wells and ponds crucial for the city's existence.[16] The idea that these landscapes are valuable and demand special attention emerged only when Delhi's expansion had decimated them or severely damaged their ecological integrity. Ironically, as is often the case, the champions of these beleaguered urban ecologies emerged from the very middle classes that were the beneficiaries of urban growth.[17] That is, the changing Ridge and the burgeoning middle classes evolved together, each giving shape to the other.

"The Ridge" is the colonial term for the area locally known as *pahaadi* (hilly land), a series of undulations that begin close to the river in north Delhi and stretch to the southwest, where they are increasingly distant from the river. Images from the nineteenth century depict the Ridge as an open, unpopulated wilderness, with barely a tree in sight. Perhaps such a view was a product of perspective: British and Indian eyes would have passed over the thorny scrub forest as a wasteland because it lacked useful or imposing trees. The Ridge may also have been laid bare over the years as trees were cut to provide city dwellers with fuel and livestock with land for grazing.[18] However, its barren contours were to turn green in the next century.

When New Delhi, the imperial capital, was being built (1911–1931) at the foot of what is now known as the Central Ridge, the viceroy, Lord Hardinge, initiated plans for extensive afforestation, imagining a dense evergreen curtain behind a "splendid… Government House" placed at the top of Raisina hill, "commanding the most lovely views over the city of Delhi and over the whole plain, both east and west" and "dominating the whole of the country round," with the slope down to the plain "covered with terraces and fountains like a miniature Versailles."[19] To create this arboreal backdrop for the principal seat of imperial government, Hardinge drew upon the expertise of P. H. Clutterbuck, a forester from the United Provinces, who suggested a number of indigenous trees from the drier parts of the Himalayan foothills. His advice was endorsed by W. M. Hailey, who inspected the early experimental plantings in 1916: "I would not extend the plantation of exotics. They should only come after we have established indigenous trees."[20] Planting proceeded slowly and on a small scale, limited by wartime budget constraints. The results were not satisfactory. Trees died off as soon as watering was stopped; few species could withstand the rigors of Ridge conditions, its thin soils and exposure to extreme summer and winter temperatures. Over the next twenty years, the government struggled with this uphill task. Although some native trees such as *ronjh*, *palash*, and *siris* managed to survive,[21] it was the Central American mesquite (*Prosopis juliflora* or *vilayati keekar*) that proved to be the most tenacious. As the *Annual Report of Government Gardens 1935–1936* noted, "Prosopis juliflora, one of the hardiest of drought resisting trees, forms the main base of useful, evergreen vegetation[;] and trees raised from seed a few years ago are now well developed and gradually extending in to fresh ground."[22] This exotic had a strong champion in William Mustoe, director of horticulture, who is reported to have personally tucked individual seeds into the ground.[23] Mustoe's diligence and *P. juliflora*'s persistence left a lasting legacy. The "useful evergreen" tree became an invasive species, crowding out the natives. *P. juliflora* now rules the Ridge, as it does across much of the subcontinent's drylands.

Although the Ridge was designated as a "Reserve Forest" by the colonial government in 1933,[24] its legal status did not offer watertight protection. When land was needed for other purposes, portions of the wooded Ridge were made available. As the Delhi Improvement Trust expanded the city to the west to accommodate the "Depressed Castes" from the congested Walled City and those displaced by the construction of New Delhi,[25] the central section of the Ridge around Jhandewalan was cleared and leveled, thereby widening the gap between the northern and southern parts. Independence and the Partition of India in 1947 brought half a million Hindu and Sikh refugees to the city, and many of them were resettled by clearing the central and southern parts of the Ridge. The Southern Ridge was further eaten into to establish the large campus of the Jawaharlal Nehru University and other institutional and residential areas in the 1950s. At around the same time, a section of the wooded parts along the hilly spine of the Central Ridge was transferred to the army, which later illegally expanded its territory; another chunk was grabbed in the 1980s by the ashram of Asaram Bapu, a popular *sant* (holy man).[26] Numerous other encroachments over the last three decades have nibbled away at the Ridge until its death by a thousand cuts seems imminent.[27]

Not only did the forested area of the Ridge shrink because of land diversion and encroachment, but from the 1980s the character of the forest also began to change. Until then, the wooded Ridge was regarded as a wilderness and duly ignored. It was not trespassed upon except by poor men and women who collected wood from the area for cooking and heating, bribing or cajoling the rarely encountered *chaukidar* (guard). In 1978, however, the Central Ridge was the scene of a gruesome crime, filed in popular memory as the Billa-Ranga case.[28] Geeta and Sanjay Chopra, the teenage daughter and son of a naval officer, were abducted when they hitched a ride on the Ridge Road. The car was driven into the woods; Geeta Chopra was raped; she and her brother were murdered. The incident shook middle-class newspaper-reading Delhi: Geeta and Sanjay could have been their children. As the hunt for the culprits began, the Ridge came into focus as a place of danger, the locus of criminal activities. Efforts to bring law and order to the Ridge took a physical form: from being an overlooked, overgrown space, the unruly Ridge was to be disciplined.

On the Northern Ridge, the domestication of wilderness took the form of clearing the dense understorey of shrubs and creepers such as *bansa*, *heens*, *gondni*, *jangli karaunda*, *bilangada*, and *kankera* and replacing it with grass.[29] Ornamental plants and shrubs were planted in neat beds. Graveled walking paths were cut through the forest. A small pond was spanned by a bridge, picturesque reeds planted on its banks, and benches placed so that visitors could gaze upon the pretty scene. A badminton court was created in a depression near the Flagstaff Tower, which had been built by the British in 1828. The ruins of Pir Ghaib, a fourteenth-century Tughlaq hunting lodge, and Chauburja, a mausoleum from the same period, were spruced up. The Ridge was now accessible and inviting to middle-class citizens.[30]

Once manicured, sections of the Ridge were enthusiastically incorporated into the social geography of residents of well-to-do neighborhoods in the vicinity. Morning walks—the quintessential quotidian practice of urban Indians with sedentary lifestyles—bring cars to the gates of the Ridge, from which middle-aged men (and some women) alight, all wearing the sports shoes that declare their commitment to their fitness regime. They stride briskly along the paths, swinging their arms, breathing deeply to fill their lungs with the clean morning air. Some stop to stretch, a few jog; groups do yoga and laughter therapy. Others carry small packets of grain which they scatter at designated spots, charitably feeding flocks of parakeets and pigeons. Still others carry bananas to feed the rhesus macaques that infest the Ridge, their numbers proliferating on food offerings from Hindus who consider them a *roop* (incarnate form) of god Hanuman. After their vigorous exercise, many morning walkers head for the fruit vendors standing near the parked cars to drink coconut water and eat nutritious fruit such as papaya. Then they get back into their cars and drive home to bathe and start the work day.

While the crowds of morning walkers attest to the success of the project of taming the Ridge and encompassing it within the ordered realm of the city, a different facet of this accessibility becomes apparent later in the day. By late morning, well after the fitness enthusiasts have departed from the scene, the rows of parked cars outside the gates are replaced by motorcycles. Walking up the now-deserted paths, one encounters only hopeful families of macaques looking for handouts. But on the lawns, under shady trees and behind sheltering shrubs, there is a discreet but nonetheless palpable buzz of activity. Each semiconcealed spot that offers some privacy harbors a pair of young lovers looking for solitude. In a city where young women are subject to family surveillance, and escaping the censorious public eye is difficult for romancing couples, the gardens of the Ridge offer refuge. As Radhika Chandiramani writes: “There’s safety in the park. The park sets limits.[31] They hold hands, press palms together, play with each other’s fingers. … Privacy lurks in public spaces; pleasure lies in the palm of a hand.”[32] Paradoxically, the public park, where visibility is coupled with anonymity, allows a retreat from the public into a realm of privacy for partners of various sexual persuasions. Rendering the Ridge safer for citizens by converting the forest into a wooded park created a space that enables romantic and sexual practices that would otherwise have been stifled; it allows youth to express themselves as lovers, desiring and desired subjects who can more fully participate in the increasingly influential discourse of romantic love and courtship.

The domestication of the Ridge thus not only created new bourgeois forms of recreation and caring for the self, but also enabled romantic and sexual practices in public spaces, pushing against the limits of what is considered culturally tolerable and gradually widening them. Making the Ridge safer for ordinary and elite citizens had another unintended effect. Some of those who came to the park for morning walks were drawn to the area that was still wilderness. Sanjeev Khanna remembers when his dog darted into the undergrowth, chasing a Grey Partridge or some exciting scent.[33] "When I followed him, pushing through the bushes, I found myself alone. There was nothing but the sound of birds. It was cooler and the air was sweet and clear. It was gorgeous. Really wild. Other people wouldn't go into this part of the Ridge, but I loved it." Khanna was a teenager in the late 1970s, when he literally stumbled into a fascination with the wilderness of the Ridge. Later, he met a few other school and college students who were interested in bird-watching and began to go on nature rambles with them, learning about the flora and fauna of the Ridge and how it had changed over the last one hundred years and coming to understand the ecological importance of the forest. In 1979, on reading that a section of the Central Ridge had been demarcated for constructing schools, the students decided to organize a protest rally in which they were joined by the residents of Rajendra Nagar, the neighborhood next to the proposed clearance. A year later, the students went on to form Kalpavriksh, an "environmental action group" that campaigned against the diversion of the forest to other land use and the conversion of wilderness into parks.[34]

Over the next two decades, Kalpavriksh continued to monitor the Ridge's biodiversity by conducting annual bird counts and mapping the vegetation. Hoping to ignite the same spark of understanding and appreciation of the wilderness in others, members guided school and college students on "nature walks."[35] It published a booklet about the Ridge and its threatened status.[36] It petitioned the lieutenant-governor of Delhi and other officials to prevent the destruction of the Ridge. Even as Kalpavriksh went on to study and campaign about a range of emerging conflicts between ecology and economic development, traveling farther afield into rural India, the organization's early involvement with the Ridge remained a defining moment in its biography, when Khanna and others realized that it was wilderness that they loved, not a park. How this sensibility set them apart from other upper-middle-class people, and how it evolved into a critique of industrial capitalism and its consumerist culture, leading to a stand against "destructive development" in rural India, is a complex story.[37] But central to it is the sensual experience of the Ridge in the early morning, its tangled wildness a contrast to the ordered, populated park.

Since the 1980s, the Ridge has faced new threats and recruited new champions. Kalpavriksh has shifted base from Delhi to Pune, but other organizations and alliances, formal as well as improvised, have taken up the cause, focusing primarily on preventing further construction on the Southern Ridge, an area now surrounded by affluent neighborhoods, where residents have become concerned about dwindling greenery and aquifers.[38] One such campaign highlights the unintended ironies of the situation. During the lead up to the Commonwealth Games in 2010, the Delhi government planned to expand the sports facilities that it had constructed for the Asian Games in 1982 by clearing an adjacent section of the Ridge. They encountered vehement opposition, including a public-interest petition filed in court, from residents of nearby Siri Fort Village, a low-key yet luxurious haven in a prestigious location inhabited by members of the elite. As the residents denounced the Delhi government for its callous destruction of greenery, they chose to forget that the spacious bungalows in which they lived had been built less than twenty years ago by exactly the same process—clearing the Ridge.[39] Siri Fort Village was carved out of the Southern Ridge to house visiting athletes and sports officials during Asiad '82. After the games were over, the houses were sold at well below market rate to senior bureaucrats and their cronies and relatives. Beneficiaries of that process now reinvented themselves as saviors of the city's green areas.

Conclusion

As Mangarbani and the Delhi Ridge change and are threatened with change, they bring into being new allegiances and alliances.[40] These green spaces and the urban publics who cohere around them have shaped and transformed each other. Reconfigured relations in the ecological and social landscape have had uneven effects. The domestication of the wilderness of the Northern Ridge for recreational use has squeezed out the native flora and fauna; jackals, hares, and monitor lizards have now disappeared. Poor people who collect firewood and grass find it much harder to do so; vigilant middle-class walkers and patroling *chaukidars* are quick to pounce on them. The Ridge is now closed off from its past use as an urban common that provisioned those who lived by the sweat of their brow; they have been replaced by those who sweat in order to keep their bodies fit. Yet the concerns of the laboring classes have not figured in the debate over urban conservation.

In other parts of the city, the conflict over urban nature has been even more violent. Early one morning in January 1995, residents of the well-to-do neighborhood of Ashok Vihar caught and beat young Dilip to death for defecating in the open area that they regarded as their "park."[41] The opposition between different views of urban nature and its commons could not be starker. Dilip was from an adjoining *jhuggi basti* (squatter settlement), where more than ten thousand households had only twenty-four latrines between them, forcing people to use any open space, under cover of dark, as a place to defecate. The more affluent residents of the area tried to discourage this practice by building a wall between the dirty, unsightly *jhuggis* and their own homes, but the wall was soon broken to allow the daily traffic of domestic workers who lived in the *jhuggis* but worked to clean the homes and cars of the rich, as well as the nighttime passage of clandestine defecators. Dilip's death was thus the culmination of a long-standing battle over a contested space that, to one set of residents embodied their sense of gracious urban living, a place of trees and grass devoted to leisure and recreation, and that to another set of residents, was the only available space that could be used as a toilet. When a group of people from the *jhuggis* gathered to protest against this killing, the police opened fire and killed four more people.[42]

The social geography of urban nature in Delhi is a deeply riven, shifting landscape. As the villagers of Mangarbani showed by their alacrity in selling their share of the sacred forest, green spaces can become taken for granted and traded for more tangible gains. Yet other social groups have intervened to evoke a sense of loss and a renewed appreciation of the forest, leading to a new determination to save it from developers. The domesticated sections of the Delhi Ridge now accommodate morning walkers and trysting couples, members of the middle-aged middle classes and their subversive offspring. And, at the same time, for a handful of people, the park opened up a path into the wilderness as an aesthetically and ecologically superior form of urban nature.

While these are unexpected twists produced by the coming together of disparate elements and contingencies, there are expected patterns and continuities as well. More than sixty years after Independence, Viceroy's Lord Hardinge's urban forests command the higher ground close to the centers of power; the Versailles-style gardens that he envisaged grace affluent parts of the city. Greenery is a good index of a neighborhood's prestige and wealth, while its lack is a sign of social exclusion and impoverishment. Most poor, working-class areas of Delhi are massed boxes of brick and cement broken only by narrow streets. There are no trees to sit under, no grass on which to run or play or take a nap in the winter sun. The government's proud slogan of a "clean and green" city dies away once one leaves elite and middle-class areas. When green is confined to the solitary tree that has survived in a wasteland or a densely packed settlement, or the *tulsi* (sacred basil) plant growing in a recycled tin, urban nature is conspicuous by its absence.

Green is not a primary color; it is the result of mixing blue and yellow. So, too, the shades of green that are found in Delhi. Parks, wilderness, wasteland—each is streaked by social character, by ways of knowing and valuing nature that vary with the city's sharp hierarchies and shifting alliances.

Acknowledgments

Thanks to Henrik Ernstson for his close and enthusiastic engagement with this work.

Notes

1. Krishen 2006.

2. Gold and Gujar (2002) have analyzed how villagers in Rajasthan differently value *vilayati* (foreign or imported) *keekar—Prosopis juliflora* (mesquite) is a native of Mexico—and *desi* (native or indigenous) *keekar* (*Acacia nilotica*), also called *babool*. *P. juliflora*'s thorns and inedible leaves keep browsing animals away, making it useless for pastoralists seeking fodder, whereas *Acacia nilotica* yields fodder as well as an edible gum. Gold and Gujar argue that *desi* and *vilayati*—native and foreign—are binary categories that organize perceptions of modernity in rural India, especially with respect to agrarian environments and species.

3. Vrindavan, also known as Braj, is an area in present-day Mathura district, Uttar Pradesh, sacred to Krishna, the Hindu deity. In legend, Vrindavan was an ancient forest on the banks of the river Yamuna where the young Krishna lived, grazed cows, sported with village maids, and fought demons. It became a place of pilgrimage for Hindus of the Vaishnava sects from the seventeenth century onward, and several temples were built there. The forest was gradually destroyed over the last two centuries. The *kadamba* tree is associated with Krishna's life in Vrindavan: in an episode made famous in songs and paintings, Krishna stole the clothes of bathing *gopis* (girl cowherds) and hid them in a *kadamba* tree.

4. The scientific name of *dhau* is *Anogeissus pendula*. *Kala siris* is *Albizia odoratissima*, and *salai* is *Boswellia serrata*. *Kareel* is *Capparis decidua*; *roheda* is *Tecomella undulata*; *kaim* is *Mitragyna parvifolia*; and *kanju* is *Holoptelea integrifolia*. *Ronjh* is *Acacia leucophloea*; *bistendu* is *Diospyros cordifolia*; *hingot* is *Balanites roxburghi*, and *doodhi* is *Wrightia tinctoria*. *Doodhi ki bel* is *Vallaris solanacea*. For a complete list of the flora of Mangarbani, see Shahabuddin, Yadav, and Krishen (2013).

5. "Bani" means "little forest."

6. See Chakravarty-Kaul (1996) for a finely observed account of a similar conflict over the commons in North West Delhi. Her analysis includes a detailed examination of the case law on disputes around rights to the commons from the colonial period onwards.

7. This term was used by Ashok Khemka, former director general of Consolidation of Land Holdings in Haryana, an Indian Administrative Service officer turned whistle-blower, who was soon transferred out of this post (see Dogra 2013).

8. To prevent the concentration of land in the hands of a few, the law stipulates that no one can own more than 7.5 hectares of irrigated land or 18 hectares of rainfed land.

9. This is not to suggest that there has been no farmers' opposition to land acquisition for real estate development in Haryana. In 2008, a *mahapanchayat* (superpanchayat of several villages) declared that it would not allow the government to acquire twenty-five thousand acres of land from twenty-two villages in Jhajjar district and eighteen villages in Gurgaon district for a Special Economic Zone to be set up by Reliance Industries, India's biggest private company (see Deswal 2008). However, such instances of resistance in Haryana and neighboring Uttar Pradesh are primarily tactics for negotiating better terms, not stopping land transactions. Landowners are not unwilling to sell; they just don't want to get a pittance from the government, which then hands over the land to a private company, which makes a killing from the rise in its value. Michael Levien's (2012, 2013) research on land acquisition in Rajasthan shows that land prices rose eight to twelve times after such a transfer, an escalation that the original landowners did not benefit from.

10. Temples sprout up almost overnight on city pavements, in the crevices of *peepal* (*Ficus religiosa*) trees, as kiosks set into walls, on abandoned plots of land, and in squatter settlements as a bid to stake claim to land that a state soft on "hurting religious sentiments" is reluctant to act against. From a small icon, to tiled and cemented surrounds, to concrete canopies and domes is usually a series of quick steps, as is the emergence of a thriving spiritual economy of patrons, priests, vendors of ritual offerings, and worshippers. However recent their vintage, temples tend to announce themselves as *pracheen* (ancient) from the get-go.

11. Boosters style Gurgaon as the "Millennium City," a destination for corporate offices and high-end residential projects with names like Belvedere Towers and Malibu Towne, but first among the basic infrastructural amenities absent in the city is water. Overexploitation has depleted the aquifer; groundwater is brackish. The more Gurgaon's affluent population grows, the worse its water problems (Soni 2000). Environmentalists have so far not been successful in either regulating groundwater extraction in Gurgaon or instituting rainwater harvesting on a significant scale. For an account of unregulated urbanization and the creation of landscapes of inequality on Delhi's periphery, see Soni (2000) and Chatterji (2013).

12. Shrivastava 2013.

13. "No Tourism Activity" 2014.

14. Palash is *Butea monosperma*; amaltas is *Cassia fistula*.

15. Krishen 2006.

16. For an account of the changing place of the Yamuna floodplain in urban political economy and ecology, see Baviskar (2011b).

17. Cf. Williams (1972).

18. According to forester R. N. Parker (1920, p. 25), this is likely to have occurred after the 1857 mutiny because, at that time, the vegetation was thick enough for "the attacking [British] force [to] advance 'concealed in the brushwood stretching up to within musket shot of the walls' [of the Mughal city of Shahjehanabad]." It is also reported that Firoz Shah Tughlaq, sultan of Delhi from 1351 to 1388, planted trees on the northern Ridge and used the area for hunting.

19. Letter from Hardinge to Edwin Lutyens, August 19, 1912, quoted in Krishen (2006, p. 37).

20. Letter from Hailey, Secretary, Notified Area Committee, January 13, 1916. Hailey went on to become the chief commissioner of Delhi (1918–1924). Delhi State Archives.

21. The scientific name of *siris* is *Albizzia lebbek*.

22. Department of Horticulture of Government Gardens 1936, p. 8.

23. George 1958, p. 86.

24. It had been fenced off from grazing earlier, in the late 1910s.

25. Hosagrahar 2005; Legg 2007.

26. The establishment of the ashram was challenged in a 1985 public interest petition, but in 1996 the Supreme Court allowed it to be regularized, despite opposition from forest officials. However, the recent fall from grace of Asaram Bapu, now facing trial for raping a minor at his Jodhpur ashram, may mean that action will finally be taken to close the ashram (Shrangi 2014).

27. For details of the area of the Ridge and its current land status, see Delhi Forest Department (2017). See also Kothari (1988).

28. Billa and Ranga were the two men who were eventually convicted of the crime.

29. Bansa is *Adathoda vasica*; heens is *Capparis sepiaria*; gondni is *Grewia tenax*; jangli karaunda is *Carissa spinarum*; bilangada is *Flacourtia indica*; and kankera is *Maytenus senegalensis*.

30. The process of “beautifying” the Ridge in the 1970s and 1980s was less pronounced in the Central Ridge (where a large section had already been carved out as the Buddha Jayanti Park in the 1960s) and the Southern Ridge (which was not yet surrounded by the upper-middle-class residential neighborhoods that came up in the late 1980s).

31. Here, Chandiramani (2001, pp. 197–198) is referring to young women who, while willing to engage romantically with their partners, want to be able to control what they do. Sexual coercion, including rape, by one’s companion is less likely when there are other people around and where a chaukidar or itinerant vendor is a shout away. The “wild” part of the Ridge would not be safe (or comfortable) in this respect.

32. The discussion of contestations over public spaces focuses mainly on the tensions between bourgeois notions of spatial order and public conduct and their defiance by the poor (cf. Kaviraj 1997) and, to a lesser extent, on how this patriarchal spatial order marginalizes women (cf. Ranade 2007). The use of public parks by young men and women seeking privacy and the social disapproval that they face, which can even take the form of humiliating remarks and physical harassment by Hindu nationalist “moral police” vigilante groups, suggests that age-based discrimination is as much a part of the conflict over parks as are class and gender-based orientations.

33. Name changed.

34. Kalpavriksh has gone on to become a well-known research and advocacy NGO, working on issues of ecological sustainability and social equity. It was a pioneer in

developing a broad-based critique of large dams, and has worked extensively to promote community-based natural resource management (see Kalpavriksh n.d.).

35. For a survey of Kalpavriksh's engagement with the Ridge by one of the organization's founder-members, narrated as the account of a nature walk, see Kothari (1988). For an analysis of how activities such as hiking foster a "love for nature" among students in Indonesia, see Tsing (2005).

36. Kalpavriksh 1991.

37. The history of the wilderness movement in India has been sketched by Ramachandra Guha (1989) and Mahesh Rangarajan (1996). Their analysis has focused on the ideological strands of the movement, which range from the socially conservative, demanding "inviolate areas" for megafauna, to the more human rights–oriented "community based management." However, a social history that examines the class background of "wilderness lovers" and relates it to their ways of being in the world and 'structures of feeling' remains to be done (cf. Bourdieu 1984). A small beginning has been made by Mawdsley (2004) and Baviskar (2011a).

38. See Ghertner (2011) for a discussion of one such controversy near Vasant Kunj, where the Delhi Development Authority violated its own master plan to allow the construction of shopping malls and a luxury hotel on a remaining section of the Ridge, a move that was retrospectively legalized by the court.

39. Baviskar 2010.

40. Walker (2007) provides a superb, richly detailed account of this process in the San Francisco Bay Area of California. See also his chapter in this volume.

41. See Baviskar (2003) for other instances of bourgeois environmentalist campaigns to create a "clean and green Delhi," which target the city's working-class occupations and neighborhoods as prime offenders.

42. See report from People's Union for Democratic Rights (1995).

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ignored the existing historical development, it fitted the city neatly into the geomorphology of the basin of the river Spree and thereby translated the idea of organic city planning into a locally specific urban vision.

The division of Germany made the realization of a master plan for the entire city impossible. The "16 principles of urbanism" launched by the East German government in 1950 rejected the idea of a synthesis of town and country, and instead called for a compactly structured "socialist" city with monumental centers. Such a city was also seen as "organic," but only in the sense that its components formed a functional whole, not because of its visual morphology.[20] In West Berlin, actual development proceeded through a pragmatic and piecemeal approach of clearing rubble and renovating and rebuilding existing property.[21] The 1948 Bonatz-plan and the subsequent land-use plan for West Berlin (issued in 1950) refrained from radical changes to the city layout. In the end, it was only the reconstruction of the destroyed Hansaviertel that resulted in a coherent architectural ensemble that corresponded to the ideas of the *Stadtlandschaft*. The project was actually a propagandist landmark of Western urbanism to demonstrate a "free-world" alternative to the monumental projects being realized at that time at the East Berlin Stalinallee.[22] In the late 1960s, East Berlin saw the spread of modernist housing projects, made with precast concrete slabs (*Plattenbauten*), on the outskirts and in destroyed inner-city areas.[23] Although these settlements were loosely structured with green spaces, they were meant not to realize an organic *Stadtlandschaft*, but to technically and economically rationalize housing construction.

At least in West Berlin, the term *Stadtlandschaft* remained a guiding principle of green planning. Directly after the division of the city in 1949, the West Berlin municipality launched its "Green Emergency Program" to reconstruct green spaces, playing fields, and sports grounds. Here specific local politics mattered to the way in which urban nature was articulated. Greening was meant to reconstruct some sense of order in the chaos of the damaged city, and with the sharpening of the Cold War—notably the Russian blockade during the winter of 1948–1949—to demonstrate political assertiveness against the East. In line with the ideals of organic urbanism, Berlin garden director Witte argued that urban planning in his city should consider the "connections and circumstances of the natural landscape."[24] This orientation manifested itself in the creation of extended green belts such as the promenades along the natural waters and urban

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9 Regimes of Urban Nature: Organic Urbanism, Biotope Protection, and Civic Gardening in Berlin

Jens Lachmund

In the early 1960s, the Berlin writer Irmgard Wirth called attention to the widespread existence of parks, gardens, and various pieces of the rural landscape within or in the close vicinity of her city:

> Ranging from the small square the size of a block with lawns, flowerbeds and shadowing trees and bench to rest for the air hungry city dweller, to the extended people's park [*Volkspark*]…, to the remaining villages with their old churches, estates, farm houses, meadows and fields, to the distinguished mansion districts with their gardens, or the residential areas from the 1920s that are pervaded with green, to the Grunewald or the vast Spandau- and Tegel-forest in West Berlin, which are almost deserted during the week,—about one fourth of the total surface of this city is "nature," before and beyond the wall it consists of water, forest, and heath![1]

This characterization of Berlin as an extraordinary "green" city in which "nature" abounds has been a constant feature of public discourse in the post–World War II period.[2] More than just a description of the actual cityscape, imaginings of urban nature guided urban policy and contributed to the city's identity. Already, since the late nineteenth century, urbanists, nature conservationists, and large parts of the urban public had been convinced that "green" or "nature" was a necessary antidote to the anonymity, density, and fast pace of the modern metropolis, the poor living conditions of industrial workers, and the traffic, noise, and air pollution that pervaded the city. Many of the basic worries that motivated planners in that period to create public parks, to plant trees, and to protect the urban forests on the fringe of the urban area persist in more recent attempts to "green" the city. At a more concrete level, however, there are considerable differences between the ways that nature has been identified and framed, what kind of problems of the city it has been supposed to mitigate, and how the concern for nature

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[illegible] coherence and stability, the chapter seeks to explore the [illegible] ways in which in each of these regimes, the framing of urban nature has been articulated with changing definitions of how citizen- [illegible] governing of urban space.

Protecting and Promoting Urban Biotopes

Until the unification of Germany in 1990, the city on which this study [illegible] the [illegible] scenery (see [illegible] st regime I discuss the attempt of planners and city gardeners in the [illegible]

[illegible] large campus of the Jawaharlal Nehru University and other institutional and residential areas in the 1950s. At around the [illegible] parts along the hilly spine of the Central Ridge was transferred to the army, which later illegally expanded its [illegible]

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[illegible] organic urbanism,[5] a nature regime that [illegible]

[illegible] so-called *Mietskasernen* (rental barracks) [illegible]

[illegible] benches placed so that [illegible]

[illegible] 1828. The ruins of Pir Ghaib, a fourteenth-century Tughlaq hunting lodge, metropolis with those of a simple, close-to-nature countryside life."[11] The concept showed many parallels with the garden city ideal as well as with the program of modernist urbanism of the Athens Charta.[12] It shared with the latter a preoccupation with a spatial separation of urban functions and the call for vast open spaces that would connect the city to its surrounding landscape. The core idea was to shape an "organic" morphology of the city, which itself was an attempt to engineer an equally organic form of social life.[13] In this respect the approach has similarities with *Landschaftspflege* (landscape care), which had earlier attempted to integrate traffic and industrial infrastructures "organically" into the natural landscape. Although the longing for organic forms was not restricted to Germany, it was especially here that it gained in popularity in the Weimar years and notably under National Socialism, when planning for postwar reconstruction embraced the city landscape ideal.[14] The term "organic" received its rhetorical punch through its semantic opposition to the "mechanical," which was associated with density, right angles, disconnection from surrounding landscapes, and a supposed lack of social bonds among the inhabitants. In a trendsetting textbook on "organic urbanism" from 1948, Hans Bernhard Reichow portrayed the city as a machine, alienating its residents from nature.[15] In contrast, an organic city would consist of a hierarchy of nested units: cells, neighborhoods, districts. In 1950 the conservative garden designer Gustav Allinger dreamed of Berlin as a "new city," one that would be a "living organism that is connected to nature."[16] In the same vein, Johannes Göderitz, Roland Rainer, and Hubert Hoffmann characterized their ideal of an "articulated and low-density city" as a "spatially loosened, yet functionally closely entangled texture of single cells of human size."[17] The term "organic" pointed mainly to the morphology of the city as conceived from the bird's-eye perspective of the planner's table. The city should extend smoothly into the surrounding landscape and its material design should imitate natural forms. By structuring the city into small "organic" segments of neighborhoods, planners also wanted to reconstitute close community bonds within the modern metropolis.[18]

The concept of organic urbanism was the basis of the 1946 Kollektivplan for the rebuilding of Berlin, developed by a planning team led by the architect Hans Scharoun.[19] It envisioned a radically restructured city, consisting of dispersed modernist buildings, clustered into homogenous neighborhoods, and cut through by highways and green spaces. Whereas the plan ignored the existing historical development, it fitted the city neatly into the geomorphology of the basin of the river Spree and thereby translated the idea of organic city planning into a locally specific urban vision.

The division of Germany made the realization of a master plan for the entire city impossible. The "16 principles of urbanism" launched by the East German government in 1950 rejected the idea of a synthesis of town and country, and instead called for a compactly structured "socialist" city with monumental centers. Such a city was also seen as "organic," but only in the sense that its components formed a functional whole, not because of its visual morphology.[20] In West Berlin, actual development proceeded through a pragmatic and piecemeal approach of clearing rubble and renovating and rebuilding existing property.[21] The 1948 Bonatz-plan and the subsequent land-use plan for West Berlin (issued in 1950) refrained from radical changes to the city layout. In the end, it was only the reconstruction of the destroyed Hansaviertel that resulted in a coherent architectural ensemble that corresponded to the ideas of the *Stadtlandschaft*. The project was actually a propagandist landmark of Western urbanism to demonstrate a "free-world" alternative to the monumental projects being realized at that time at the East Berlin Stalinallee.[22] In the late 1960s, East Berlin saw the spread of modernist housing projects, made with precast concrete slabs (*Plattenbauten*), on the outskirts and in destroyed inner-city areas.[23] Although these settlements were loosely structured with green spaces, they were meant not to realize an organic *Stadtlandschaft*, but to technically and economically rationalize housing construction.

At least in West Berlin, the term *Stadtlandschaft* remained a guiding principle of green planning. Directly after the division of the city in 1949, the West Berlin municipality launched its "Green Emergency Program" to reconstruct green spaces, playing fields, and sports grounds. Here specific local politics mattered to the way in which urban nature was articulated. Greening was meant to reconstruct some sense of order in the chaos of the damaged city, and with the sharpening of the Cold War—notably the Russian blockade during the winter of 1948–1949—to demonstrate political assertiveness against the East. In line with the ideals of organic urbanism, Berlin garden director Witte argued that urban planning in his city should consider the "connections and circumstances of the natural landscape."[24] This orientation manifested itself in the creation of extended green belts such as the promenades along the natural waters and urban canal.[25] In 1960 the West Berlin parliament decided to create a comprehensive framework (*Hauptgrünflächenplan*) for the further development of a network of green space. The concept also inspired attempts to preserve green areas on the fringe of the city, for example by turning them into protected landscape reserves.” Another way in which organic planning left its mark on the city’s material ecology was in the treatment of the various rubble mounds that resulted from the clearance of bombed quarters and mushroomed in both East and West Berlin.[26] In the latter, these could become landscape opportunities. Thus, for example, rubble that accumulated north of the Grunewald forest, the so-called Teufelsberg, was shaped as a natural-looking hill planted with dense vegetation and connected to surrounding parks and forests.

As we have seen, the organic nature regime implied a quite far-reaching attempt to transform the natural, and indirectly also the social, characteristics of the city. The focus thereby, however, was mainly on urban form. This meant that the discursive ownership of the regime remained largely in the hands of planners, not nature conservationists, civic activists, or ecologists. This only changed with the emergence of biotope protection as a focus of a novel urban nature regime.

Protecting and Promoting Urban Biotopes

The Südgelände (literally, southern area) is the site of a former railroad marshaling yard in the former West Berlin district of Schöneberg. Since the railroad yard had been abandoned in 1948, it had become overgrown with an impressive wood-like wilderness. When in the 1980s plans for a new railway station at this site became public, nature conservationists, ecologists, and activists campaigned for the preservation of what they considered a valuable piece of urban nature. The campaign was successful, and in 2000 a nature park was opened in the Südgelände, both to protect the biodiversity of the site and to allow residents to enjoy its scenery (see figure 9.1).

As in the earlier attempts to create organic landscapes, the nature park was meant to improve the quality of the city through the promotion of nonhuman nature. At the same time, however, the understanding of nature and of its supposed place in the city differed considerably. Already since the 1970s, the concern for urban nature had shifted from matters of urban

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9 *Regimes of Urban Nature: Organic Urbanism, Biotope Protection, and Civic Gardening in Berlin*

Jens Lachmund

In the early 1960s, the Berlin writer Irmgard Wirth called attention to the widespread existence of parks, gardens, and various pieces of the rural landscape within or in the close vicinity of her city:

> **Ranging from the small square the size of a block with lawns, flowerbeds and shadowing trees and bench to rest for the air hungry city dweller, to the extended people’s park [Volkspark]..., to the remaining villages with their old churches, estates, farm houses, meadows and fields, to the distinguished mansion districts with their gardens, to the residential areas from the 1920s that are pervaded with green; to the Grunewald or the vast Spandau-and Tegel-forest in West Berlin, which are almost deserted during the week,—about one fourth of the total surface of this city is “nature,” before and beyond the wall it consists of water, forest, and heath![1]**

This characterization of Berlin as an extraordinary “green” city in which “nature” abounds has been a constant feature of public discourse in the post–World War II period.[2] More than just a description of the actual cityscape, imaginings of urban nature guided urban policy and contributed to the city’s identity. Already, since the late nineteenth century, urbanists, nature conservationists, and large parts of the urban public had been convinced that “green” or “nature” was a necessary antidote to the anonymity, density, and fast pace of the modern metropolis, the poor living conditions of industrial workers, and the traffic, noise, and air pollution that pervaded the city. Many of the basic worries that motivated planners in that period to create public parks, to plant trees, and to protect the urban forests on the fringe of the urban area persist in more recent attempts to “green” the city. At a more concrete level, however, there are considerable differences between the ways that nature has been identified and framed, what kind of problems of the city it has been supposed to mitigate, and how the concern for nature

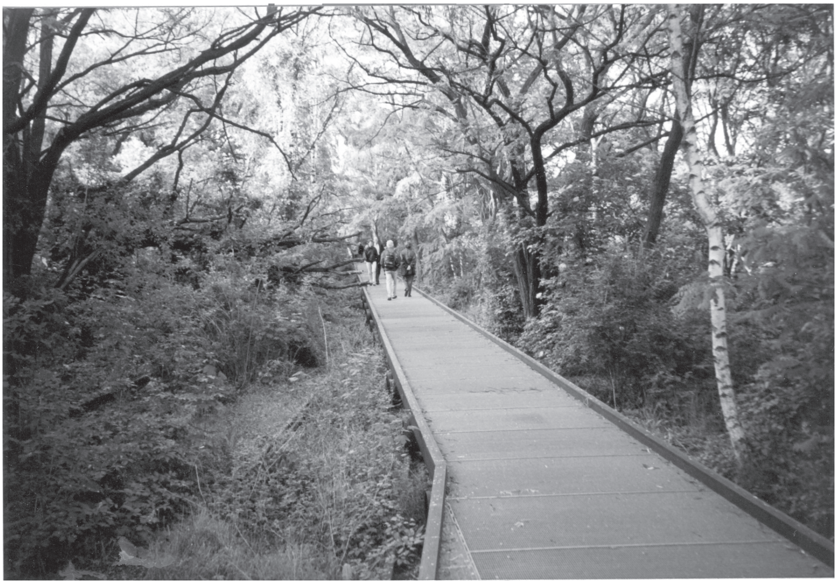

Figure 9.1
The Südgelände. Photo by Jens Lachmund.

form to the protection of plant and animal species and their biotopes. Around this concern a quite distinct set of practices and discourses assembled, which I call the *biotope protection regime*. It included diverse actors ranging from academic ecologists to amateur naturalists and conservationists, middle-class neighborhood activists, and representatives of the left-alternative counterculture that flourished in West Berlin at this time. Although these actors and their political strategies differed considerably, they all achieved their political self-definition and their goal orientation at least partly through their sustained engagement with the urban spaces that they framed as biotopes. As with organic urbanism, state-centered planning schemes remained a main policy instrument within this regime. Its content and political momentum, however, were largely the result of contestations and negotiations that extended into the domains of scientific practice as well as civic activism.

In the wake of the international consolidation of ecology in the 1960s and 1970s,[27] some researchers had developed formalized ecosystem models to represent the throughput of energy and materials in exemplary cities.[28] West Berlin soon became recognized as one of the main local centers of this urban turn in ecology. It was not so much the application of formal ecosystem models, however, that characterized Berlin's ecology, but systematic botanical (and to a smaller extent, faunistic) fieldwork within and about the spaces of the city. A central role was played by Herbert Sukopp, a botanist who in 1969 became professor at the Technical University (TU Berlin) and who in 1972/1973, together with two other professors, established a distinct department for ecology.[29] Within a few years Sukopp and a growing number of students and assistant professors had become the most renowned representatives of German urban ecology.

This urban turn can be partly explained by the geopolitical situation of West Berlin and its deprivation of its hinterland, which meant that many ecologists tended to concentrate on the city when doing practical fieldwork. Another factor is that from the late nineteenth century, Berlin had a strong local natural history tradition, and this meant that in the postwar era, local naturalists were able to provide ecologists with an extended historical record against which they could measure the ongoing development of flora and fauna. Moreover, having themselves been cut off from their former rural observation grounds, the naturalists became important collaborators of ecologists in surveying West Berlin's flora and fauna. A third factor was the long-lasting impact of the bombardments of Berlin during World War II. The vast wastelands of bombed plots and the rubble heaps that mushroomed in the outskirts made the city a particularly exciting place for ecologists. The plant species that grew in these places constituted a ruderal vegetation, which differed considerably from the ordinary vegetation of that region. Next to various urban parks and the few nature reserves that had been left intact on the outskirts of West Berlin, such wastelands become a favored site for ecologists' studies.

Sukopp's work in Berlin revolved around the question of how the impact of human land use influenced the composition of the vegetation. He noted particularly the high amount of neophyte species, as well as the absence of many original species that had existed in the area.[30] Although the influence of human land use was pervasive in the Berlin environment, Sukopp argued that its extent depended on the specific use of land and thus varied accordingly.[31]

In the late 1970s, ecological knowledge practices began to coalesce with administrative practices and the city's emerging civic environmental activism to form a politically significant nature regime. Ecologists themselves, notably Sukopp, promoted urban ecology as a practically oriented planning science. He posited that urban spaces were living spaces or biotopes, which hosted various plant and animal species, often even more than rural landscapes. At the same time, however, he warned that nature in the city was endangered by intensifying urban development and that measures should be taken to integrate nature promotion systematically into the planning process. He and other ecologists argued that nature in the city should be preserved not only for its own sake, but also to create better conditions of life for urban citizens.[32] Regular contact with natural environments was considered necessary for city dwellers and even a prerequisite for the healthy development of children. Equally important, the existence of nature in the city was also considered as a means to strengthen other components of the urban ecosystem, such as the quality of the air, soil, and water supply. Although similar arguments had been presented in earlier writings on urban green spaces and garden cities, the argument was now reframed in bio-ecological terms. In particular, since the 1970s, the term “biotope,” which denotes a topographical area in which specific biological populations live, has become a political catchword that has penetrated deeply into public consciousness.

Among the allies who sponsored ecologists’ agenda, landscape planners and urban environmental activist groups were salient.[33] Evolving from the traditional field of *Landespflege* (landscape care), which had been based largely on a horticultural approach, the new field of landscape planning established itself as a problem-solving discipline, based on ecological research. The profession expanded through the provision of new academic education programs, the largest of which was at TU Berlin. The department of ecology provided teaching for this program. Hence, the new generation of landscape planners passed Sukopp’s courses, acquired theoretical and practical skills in urban ecology, and largely adopted a commitment to protecting urban biotopes. Often these planners found jobs in Berlin’s public administration or as independent consultants, and thereby became important multipliers of ecology’s tenets in urban politics.

A notable difference between the biotope protection regime and the earlier organic one is the convergence of expert-based policymaking with an actively participating citizenship. The spectrum of civic activism in West Berlin ranged from traditional, often politically conservative nature conservation organizations, to middle-class neighborhood activist groups—the so-called *Bürgerinitiativen*—to a colorful counterculture that flourished in some urban quarters. Although the political agenda differed considerably among these groups, they all opposed the various traffic infrastructure projects (highways, canal reconstruction, new power plant) that the Berlin Senate planned at that time, and they all drew at least partly on ecological arguments and research results to bolster their claims against related land-use changes. In such a way they also appropriated the biotope and the plant and animal species of the city as political categories and objects.[34]

The biotope protection regime gained momentum through the Biotope Protection Program, an ecological masterplan for West Berlin, which was publically presented in 1984.[35] The proposal had been prepared by a working group under Sukopp's directorship. Sukopp and his collaborators divided the city into fifty-seven ecological units, or "biotope-types," and assigned different meanings and functions to these spaces. Areas that were "close to nature," such as the few remaining fens, were seen as refuges for original species that were declining in the region. Proposed measures therefore consisted mainly of the minimization of human impact, so that at least the most valuable of these biotopes could survive in the surroundings of the city. For rubble areas and other vacant lots, ecologists emphasized the value of the flora and fauna. They also saw parks and other urban greeneries not only in terms of their aesthetic qualities or recreational functions, but also as biotopes, and they made suggestions for how greeneries should be planted and kept in order to optimize their ecological qualities. For example, whereas the constant removal of weeds is a conventional gardening practice, ecologists considered weeds to be "spontaneous" vegetation that contributed to the flora of the park and that therefore should be tolerated as much as possible. Another focus of ecologists' attention was abandoned railroad tracks and stations where astonishingly rich vegetation had developed. Even in those parts of the city that had been completely built up and paved over, ecologists recognized spaces in which plant and animal species existed and which could be enhanced by means of such practices as the greening of courtyards and roofs.

Although the biotope protection regime remained a relatively stable element of the political landscape of West Berlin and after 1990 was extended over the reunified city, its ability to actually steer urban development remained limited. This was partly due to the conflict of its guiding rationale with the urban development interests that dominated the city. The Species

Protection Program that entered into force in 1988 was harmonized with a development-oriented land-use plan that represented only a modest version of the original proposal for a Biotope Protection Program. Moreover, the legal status of the earlier program was rather weak so that its provisions could easily be sacrificed when they were in conflict with "overarching public interests." The pressure to develop was particularly strong in the aftermath of unification, when the urban railway system was extended and many former wastelands in the central area were rebuilt with shopping centers and governmental buildings of the newly designated German capital. It was only due to the legal requirement of compensation planning that claims for biotope protection could be realized. Thus, the two landmark projects of biotope protection in post-unification Berlin, the nature parks created at the former marshaling yard of Südgelände and at the abandoned airport of Johannisthal, were actually meant to compensate for the loss of nature that was caused by two major urban development projects.

Other limitations arose from the clash between practices and discourses of the biotope protection regime with those of other nature regimes. Notably, traditional forms of shaping green spaces according to horticultural aesthetics or for promoting the recreation of citizens remained deeply entrenched in the practice of administering and managing public space. Thus, the actual spatial design of the aforementioned nature parks was the result of painstaking negotiations between promoters of concerns for biotope protection with garden architects who wanted to "put nature on stage" through horticultural design.[36]

Finally, the regime was not free from internal tensions and dilemmas. Although ecologists claimed that biotopes should be protected to allow citizens to enjoy direct contact with nature, and although activists drew on ecological categories and arguments to defend open spaces in their neighborhood, in the day-to-day practice of planning these often turned out to be conflicting goals. Thus planning ideas for the Südgelände-park show a constant move away from a biotope-protection policy that would have massively restricted public access to the area. Eventually, a pathway system was constructed that allowed visitors to stroll through the area. Similar conflicts became apparent when management measures meant moving or eradicating abundant plants and thereby clashed with activists' framing of the site as unregulated "urban wilderness."

The Rise of Civic Urban Gardening

In 2009 up to 150 residents followed the call of two community activists to clear a small abandoned lot next to the busy Mortizplatz in the urban neighborhood of Kreuzberg. On various collective working days, they cleaned the area of litter and removed about one hundred black locust trees and various shrubs. Subsequently they created beds (mostly in the form of containers that could be relocated if the user agreement that the activist had negotiated with the local council expired), which were planted with vegetables and kitchen herbs. Run by a core group of project leaders and a heterogeneous set of volunteers, the Prinzessinengarten (Garden of the princess), as the site is called, has become a landmark project of civic urban agriculture in Berlin.[37]

As an attempt to improve the city and its environment by means of gardening, rather than protecting preexisting vegetation, the Prinzessinengarten can be seen as a manifestation of a third nature regime, which I call the regime of *civic urban gardening*.

This regime began taking shape around the year 2000, when Berlin and other metropolises around the world started seeing an increasing involvement of citizens in public gardening, often promoted under names such as “guerrilla gardening,” “community gardening,” or “urban agriculture.”[38] In addition to the cultivation of ornamental and edible plants in permanent community gardens, such activities include throwing flower seeds, so-called seed bombs, on public lawns and planting roadsides, tree pits, and abandoned lots. All these activities share a preoccupation with gardening as a pathway to a more livable, sustainable, and closer-to-nature urban order. In contrast to earlier forms of green planning or organic urbanism, which operated through the use of public authority and the expertise of planners and ecologists, civic gardening evokes the figure of the active citizen as the main agent of urban greening.[39]

Some of the characteristics of civic urban gardening evolved from urban nature education projects such as children’s farms (*Kinderbauernhöfe*) and school gardens in the 1980s.[40] By actively involving children in the hands-on experience of caring for plants and animals, these projects sought to contribute to their social development and well-being. Extended from children to ordinary adult citizens, this educational motive remained an important motive to the legitimization and operative organization of community gardens. On the other hand, a different kind of forerunner of civic gardening can be seen in the interventions of Berlin artist Ben Wagin, who planted Ginko trees—for example, his famous "Parliament of Trees"—at abandoned areas along the former Berlin Wall.

Such activites gained momentum and started to form a distinct nature regime also by their programmatic framing with buzzwords such as "community" or "guerrilla" gardening. The phrase "guerrilla gardening" entered public parlance as an English loanword, after it had been promoted by the London activist Richard Reynolds, and refered to illicit, and therefore supposedly subversive, activities of greening.[41] The concept of *Gemeinschaftsgärten* (community gardens) was a direct reference to the community garden concept in New York. The founders of the Prinzessinnengärten took their main inspiration from Cuba.[42] Its promoters have touted urban gardening for many reasons: to enable contact with nature, to maintain community life, to empower women or immigrants, and to promote local food production as an aspect of a sustainable lifestyle. Although translocal exchange also characterized earlier nature regimes, urban gardening can be seen as worldwide trend with a special cosmopolitan flair. Often community gardens are conceived as "intercultural gardens" and are meant to provide a place for immigrant communities and their specific gardening practices, including cultivating plants from their countries of origin.[43]

Notwithstanding the rhetoric of insurgency that accompanies many of these activities, civic gardening has found acceptance and even support from municipal councils and administrations.[44] Thus, whereas local district administrations had for some time rejected such encroachments of residents into public space (also because they feared that such plantations could damage the trees), most Berlin districts now have defined rules of good pratice and offer sponsorship agreements that allow citizens to maintain such plots.[45] They are usually run by an informal network of friends, an association or—as it is the case of the Prinzessinengarten in Kreuzberg—by social entrepreneurs. By contrast, when some small temporary community gardens were established in 2002 on abandoned plots in a neighborhood of the district Kreuzberg-Friedrichshain, it was an urban renewal agency that served as a broker, paving the way for agreements regarding the gardens with the landowners.[46] Even if officially embraced, however, the existence of community gardens can always be called into question by the municipal council or by investors. Ensuing public campaigns are rarely able to prevent alternative projects from being realized at these sites.[47] Moreover, although local government has come to play a facilitating role in civic gardening, it has not developed a coherent planning strategy, as had come together under the earlier regimes. Thus citizens who had been configured as passive residents under the first regime and allies of scientific ecologists and landscape planners under the second became the core actors around whom the civic gardening regime assembled. This is also the case in terms of the guiding knowledge on which civic gardening thrives: although various professional and semiprofessional mediators assume the role of advocates, facilitators and knowledge brokers, the cultivation of competencies by the engaged citizen is regarded as the main way in which knowledge should be produced and circulated in this regime.[48]

Community gardens are projects involving food production, sociability, political resistance, and sociotechnical learning and experimentation.[49] At the same time they are productive of new spatial formations of nature in the city, which differ as much from the parks and green zones of organic urbanists as from the biotopes that formed the focus of urban nature conservation policies. Like ecologists, civic gardeners tend to focus on the marginal spaces of the city, such as wastelands and vacant lots. But in contrast to the positive framing of wastelands as urban nature areas in the biotope protection regimes, civic gardeners tend to see wastelands as empty, ugly, and in need of occupation and maintenance so that they can be turned into productive and useful spaces to grow both food and community. As the founders of the Prinzessinnengarten described their project, it was meant to "transform a wasteland into a garden."[50]

Thus, the first symbolic act of appropriating such spaces tends to involve an outcry against their being used as dump sites. Once a community garden is under cultivation, while some community gardeners value the presence of some wildflowers in their plots, gardening inevitably implies the removal of existing vegetation to make room for their own use of the land. For example in a blogpost about the Rosa-Rose Garten we see pictures of a woman who, according to the subtitle, is proudly "removing weeds."[51] The spatial order of a fully operating community garden generally consists of arrays of beds (often elevated to prevent contact with soil contamination), filled with containers or rice sacks in which edible or ornamental plants are grown and surrounded by patches of unmaintained vegetation and pathways. Garden furniture and storage huts can be further elements.

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3. Vrindavan, also known as Braj, is an area in present-day Mathura district, Uttar Pradesh, sacred to Krishna, the Hindu deity. In legend, Vrindavan was an ancient forest on the banks of the river Yamuna where the young Krishna lived, grazed cows, sported with village maids, and fought demons. It became a place of pilgrimage for Hindus of the Vaishnava sects from the seventeenth century onward, and several temples were built there. The forest was gradually destroyed over the last two centuries. The kadamba tree is associated with Krishna's life in Vrindavan: in an episode made famous in songs and paintings, Krishna stole the clothes of bathing gopis (girl cowherds) and hid them in a kadamba tree.

4. The scientific name of dhau is Anogeissus pendula. Kala siris is Albizia odoratissima, and salai is Boswellia serrata. Kareel is Capparis decidua; rohera is Tecomella undulata; kaim is Mitragyna parvifolia; and kanju is Holoptelea integrifolia. Ronjh is Acacia leucophloea; bistendu is Diospyros cordifolia; hingot is Balanites roxburghi, and doodhi is Wrightia tinctoria. Doodhi ki bel is Vallaris solanacea. For a complete list of the flora of Mangarbani, see Shahabuddin, Yadav, and Krishen (2013).

5. "Bani" means "little forest."

6. See Chakravarty-Kaul (1996) for a finely observed account of a similar conflict over the commons in North West Delhi. Her analysis includes a detailed examination of the case law on disputes around rights to the commons from the colonial period onwards.

7. This term was used by Ashok Khemka, former director general of Consolidation of Land Holdings in Haryana, an Indian Administrative Service officer turned whistle-blower, who was soon transferred out of this post (see Dogra 2013).

8. To prevent the concentration of land in the hands of a few, the law stipulates that no one can own more than 7.5 hectares of irrigated land or 18 hectares of rainfed land.

9. This is not to suggest that there has been no farmers' opposition to land acquisition for real estate development in Haryana. In 2008, a mahapanchayat (super-panchayat of several villages) declared that it would not allow the government to acquire twenty-five thousand acres of land from twenty-two villages in Jhajjar district and eighteen villages in Gurgaon district for a Special Economic Zone to be set up by Reliance Industries, India's biggest private company (see Deswal 2008). However, such instances of resistance in Haryana and neighboring Uttar Pradesh are primarily tactics for negotiating better terms, not stopping land transactions. Landowners are not unwilling to sell; they just don't want to get a pittance from the government, which then hands over the land to a private company, which makes a killing from the rise in its value. Michael Levien's (2012, 2013) research on land acquisition in Rajasthan shows that land prices rose eight to twelve times after such a transfer, an escalation that the original landowners did not benefit from.

The Prinzessinnengarten even includes a bike repair station, a café, and an information center, all of which are accommodated in used containers or wooden huts.

Tree pits present a very different kind of opportunity for urban gardening (see figure 9.2). Unlike wastelands, tree pits belong to the formally maintained and regulated parts of the built-up environment. In the nineteenth century, planners planted trees along urban streets in order to embellish neighborhoods and to improve air quality; thus, tree plantating, like park construction, was a strategy through which classic green planners sought to remedy the supposed ills of the city.[52] The trees were placed into square openings in sidewalks, and these pits were dug out to make space for the stems and roots of trees, keep the soil loose, and provide the trees with sufficient water. Public authorities kept these spaces free from weeds, waste, and any other disfigurement. Current civic gardening efforts have reversed official criteria of public order and framed these pits as sterile and boring, as well as attracting litter and dog excrement. Initiatives to plant these areas have come from residents of nearby houses and from shop and restaurant owners who seek to embellish their sidewalks, as well as occasionally from official neighborhood initiatives.[53] Renovating tree pits can range from decorating them with a few flowers to creating minigardens that are sometimes even fenced in to keep dogs out. In contrast to community gardens these plantations usually have a purely ornamental function and represent a wide variety of visual tastes, whether for the naturalistic or the manicured. Either way, such gardens require regular care, especially when the plants are not ecologically adapted to the site and need regular watering.

Celebrations of the new gardening activities as a "search for quietness, earthing, and encounter with nature" echo earlier calls for mobilizing nature as a counterbalance to urban life and modernity.[54] The participation in the very activity of gardening tends to count at least as much for these citizens as the visual or ecological qualities of the resulting plantations. In a promotional video of the Rosa-Rose community garden, one protagonist cherishes the experience of "putting one's hands into the soil" and having a chance "to unwind from this crazy modern life behind the computer."[55] More specifically such bodily involvement with nature is supposed to create a "personal relationship with one's food,"[56] to counterbalance individualization, and to open the eyes to injustices in urban land-use development.[57] Moreover, in deliberate contrast to conventional farming practices, community gardens

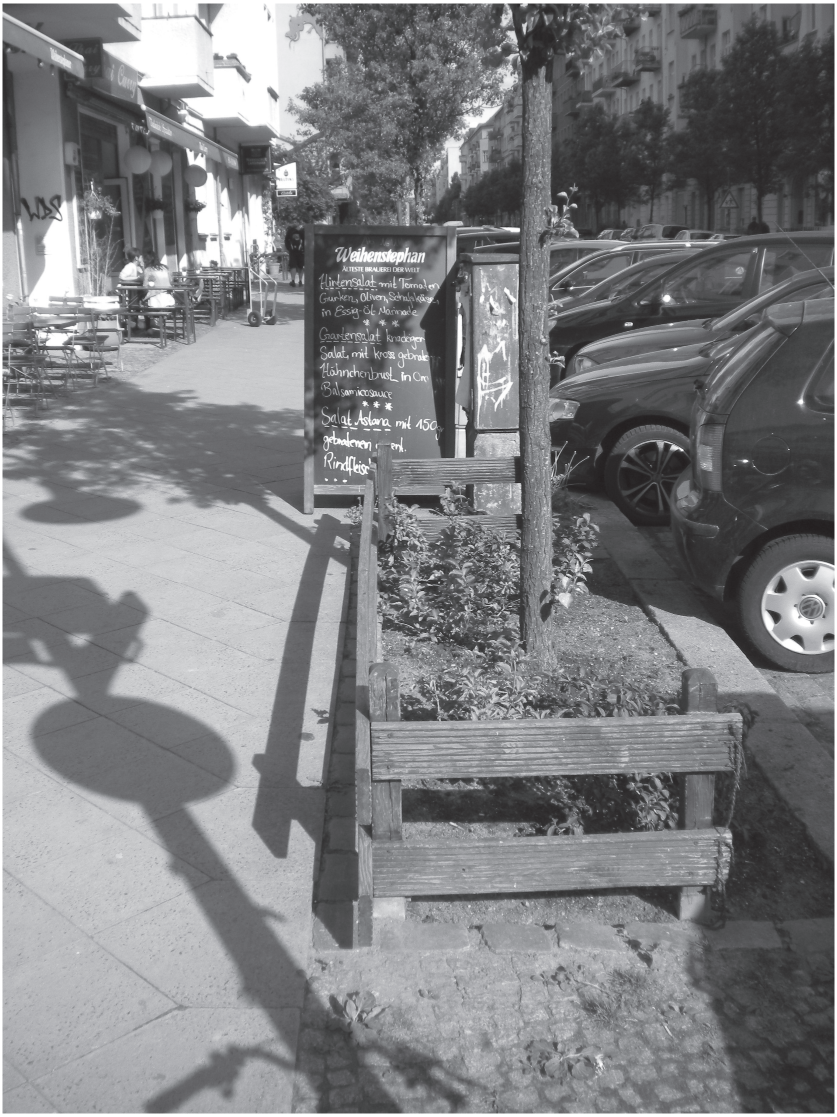
Weihenstephan
ÄLTESTE BRAUEREI DER WELT
Hirtensalat mit Tomaten
Gurken, Oliven, Schafskäse
in Essig-Öl-Marinade
Gartensalat
Salat Astana mit 150g
Rindfleisch

Figure 9.2
Tree-pit plantation in Berlin. Photo by Jens Lachmund.

tend to restrain from the use of herbicides and artificial fertilizers and instead embrace small-scale ecologically inspired forms of cultivation. For example, the Prinzessinnengarten claims to "follow the example of free nature"[58] in its decision to grow vegetables in "mixed cultures" instead of the monocultures of industrial farming.

Like urban ecologists with their concern for a specific urban kind of nature, spokespeople of civic gardening also refrain from simply imposing a pastoral imaginary on the city. For example, not only is the widespread practice of using urban-industrial materials such as plastic bags, tires, or bins as flower pots an innovative form of waste recycling, but the combination of natural and industrial elements also subverts entrenched oppositions between nature and city. Moreover, the gardens are understood and styled as elements of a specifically urban culture. Intercultural gardens translate the heterogeneity of multicultural districts into the mixing of gardening and cooking practices. For example the Pyramidengarten in the largely Turkish neighborhood Neukölln offers an Anatolian clay furnace in which, out of respect for Islamic food practices, the cooking of pork is not permitted.

For all of its heterogeneity, the new nature regime is not free from tensions with respect to the other regimes. Thus, the new regime of cultivating wastelands clearly differs from the regime of biotope protection, with its aims of protecting spontaneous ruderal vegetation and its insistence that gardening practices should be adapted to the ecology of the site and refrain from the use of purely ornamental plants. Indeed already in the 1980s, a conservationist had criticized left-wing squatters who had planted beets in a ruderal wasteland for damaging what they considered to be a valuable biotope.[59] But so far there have not been any serious conflicts, particularly since ecologists have been concerned mainly with larger wasteland areas with variegated vegetation whereas civic gardening tends to focus on small plots in densely built districts.

Internally, however, the broader civic gardening regime has its own contradictions and dilemmas. One involves its uneasy mixture of public openness and individual responsibility. Thus, on the one hand, public gardening strives to open up hidden spaces for public appropriation in ways that subvert, minimize, or even conflict with existing private property rights and administrative powers. On the other hand, the practice of civic gardening operates through informal systems that distribute responsibility to individuals or groups and thus lends itself to the creation of informal pieces of quasi-property, such as manicured, fenced-in tree pits and individually "owned" flower beds in some community gardens.

Another dilemma is that while the rhetoric of insurgency underpins the political identity of the regime's participants, they themselves need to cooperate with local governments to realize the benefits of civic gardening. Some commentators have cherished community gardens as seedbeds of alternative economies and social relations that would contradict neoliberal hegemony,[60] but as Marit Rosol has recently argued, the devolution of public responsibility to citizen gardeners falls squarely into the logic of neoliberalism. As she posits, the increasing involvement of the local state as a facilitator of civic gardening activities tends to undermine the politically transgressive motives of these civic gardening activities.

In a similar vein, there is a tension between the tendency of urban gardening to subvert urban order and the performativity of its own practices in creating an alternative urban order. As much as civic gardening diverges from the official order of green planning and sidewalk management, it nevertheless embodies cultural criteria of order that mark places as either well maintained or derelict and are performative of socially exclusive models of citizenship. Nonhuman entities that might be accepted in other places, such as weeds, do not "belong" to a proper community garden. But also, homeless people or dog walkers who have often used the same areas no longer fit with the new spatial order of civic gardening. Moreover, many gardens have become signifiers of a young educated middle-class milieu, vaguely resonating with the recent hype of urban "creativity," and thereby tending to create socially exclusive atmospheres.

Conclusion

The comparison of the three urban nature regimes over time has revealed both continuity in the mobilization of nature as a means of urban change and considerable differences between the ways in which urban nature has been framed and imagined. It is striking that some discursive motives—such as the idea of healing urban problems through enabling contact to nature—have persisted from the nineteenth century to the present. As we have seen, however, terms like "city" and "nature" meant very different things at different times, and hence led to rather distinct regimes. For organic planners, the formation of landscapes was the main focus; for ecologists nature has consisted of the plant and animal species that could be experienced in a city, and for proponents of civic gardening, nature is a worksite that gains personal, social, and political significance through its engagement in embodied practices. As Macnaghten and Urry have said of nature in general, we can talk only in the plural about urban nature, as actually or potentially contested formations.[61]

Nature in all of these regimes has served as an anchor for political imaginaries. Different ideas of nature have served as precepts for critical judgment about urban development as well as a guidelines for decision-making about how spaces should be designed and used or in some cases exempted from human usage. The discourses of these regimes are not free from romantic allusions to nature as the “other” to the city. Nonetheless, nature in these different contexts has been both conceptually and practically urbanized. This process is most evident in the regime of civic gardening and its attempt to frame nature as the nexus of an explicitly urban and cosmopolitan lifestyle. In urban ecology, urbanization of nature is apparent in the valuation of humanly influenced vegetation such as the weeds and neophyte species growing on wastelands, which does not fit with the more ruralist and nativist imaginary of traditional nature conservation. In organic urbanism, the process arose from the experience of the spectator in the landscape as well as from the planner’s synoptic gaze on the drafting table. Form, conceived of as organic, was the uniting principle that was supposed to bridge and smooth the differences between nature and the city. At the same time each of the regimes implies different positionings of citizens: as targets and passive recipients of urbanist planning ideas, as political activists who form alliances with ecologists, or as participants in civic greening action and as active holders of urban environmental knowledge. Thus, each of these regimes manifest rationalities and practices that are distinct from and even in conflict with the others.

Although this chapter has focused on only one city, it is clear that none of these regimes has developed in isolation. In some cases, nature politics in Berlin preceded similar developments in other cities, while in others it incorporated ideas and practices that had already been articulated elsewhere. As historians of technology Mikael Hård and Thomas Misa have put it, urbanist ideas and practices not only “circulate” between different cities; they are also appropriated—selected, tuned, transformed—in ways that reflect and sustain the particularities of different places.[62] In Berlin, ideas of the city landscape chimed with general trends in urbanism but gave it a special organic tint and translated it in new ways of green space planning during the postwar reconstruction process. Biodiversity conservation and the search for new ecological planning practices were worldwide trends in the 1980s, but due to the specific conditions of postwar Germany, Berlin was one of the first places where such concerns were systematically implemented in city planning. Notably the emergence of the wasteland as a major research object of ecologists, which then also turned into a conservation object, gave these initiatives its specific local emphasis. Urban gardening in Berlin has been inspired by development in North American cities and in the global South, but has drawn equally on local traditions such as children's farms and earlier concerns with urban nature. Moreover, as in many other European metropolises, urban gardening has become an aspect of a middle-class green lifestyle instead of a resistance movement of socially disadvantaged groups. Therefore, it would be misleading to consider Berlin as an exemplary case of an overarching global master trend. The timing and the concrete pathways through which each of the regimes took shape in Berlin was enabled by, and articulated in close interaction with, the local constellation of Berlin's politico-cultural milieu and the concrete materialities of its parks, forests, and wastelands.

Acknowledgments

I want to thank the editors and the participants of the Grounding Urban Natures meeting in Stockholm for the many comments and suggestions on the earlier drafts of this chapter.

Notes

1. Wirth n.d. [1964?], n.p.

2. For a recent example see the Berlin Senate's "Natürlich Berlin" [Naturally Berlin], an overview of the city's nature reserves (Senatsverwaltung für Stadtentwicklung, Berlin 2008).

3. Lachmund 2013.

4. My concept of "nature regimes" draws loosely on Arturo Escobar (1999) and is defined as "a dynamic set of relations that include (1) the portions of the non-human world that are claimed to represent valuable forms of nature and that

therefore are supposed to require public attention or care, (2) the practices and discourses through which such claims are produced, promoted, and incorporated into public policies, and (3) the individuals, collectives, and institutions that assemble around and actively sponsor these claims" (Lachmund 2013, p. 5). In *Greening Berlin* I presented an in-depth analysis of the "biotope-protection regime" and also dealt briefly with some preceding regimes, including organic urbanism. In this chapter I draw on findings of this book and combine them with more recent work on emerging forms of urban gardening in Berlin.

5. Wagner-Conzelmann 2007.

6. Durth and Gutschow 1988.

7. Wagner-Conzelmann 2007, pp. 17–21.

8. Taut 1946; Allinger 1950, p. 6; Hentzen 1950. See also Bodenschatz (1987, p. 63).

9. See Ladd (1990) for a detailed analysis of this urban imaginary and its dominance in the German planning world.

10. Hegemann 1992 [1930].

11. Reichow 1948, p. 32.

12. The 1933 "Athens Charta" of CIAM (Congrès Internationaux d'Architecture Moderne) reflected mainly the modernist ideas of the Swiss-French architect Le Corbusier. On CIAM's modernism, see Misa (2008).

13. Durth and Gutschow 1988.

14. See ibid. The justification of landscape-oriented urbanism resonated quite well with the nativism of the Nazi ideology. For example, Hentzen (1950, p. 339) claimed that Germans had a more intimate relationship to living things than other peoples. The quest for organic forms, however, was a much broader phenomenon of the period and could also be found outside of Germany; for example, in France Le Corbusier embraced the "organic" structure of Algiers and other non-Western cities as a more lively an alternative to the Western metropolis (see Haffner 2013, pp. 47–48).

15. Reichow 1948.

16. Allinger 1950, p. 154.

17. Göderitz, Rainer, and Hoffmann 1957, p. 8.

18. See Durth and Gutschow (1988).

19. Bodenschatz 1987.

20. Michel and Schulz 2006.

21. Bodenschatz 1987.

22. Ibid., pp. 165–170; Wagner-Conzelmann 2007, pp. 54–95.

23. Michel and Schulz 2006.

24. Witte 1960, p. 216.

25. Witte 1960, p. 218.

26. Fichtner 1977.

27. Söderqvist 1986; Kwa 1989; Kingsland 2005.

28. For example, Duvigneaud 1974.

29. The following section is largely based on chapters 2 and 3 of Lachmund (2013), where a detailed analysis of this approach of urban ecology can be found.

30. Sukopp 1968.

31. Sukopp 1973, pp. 91–92.

32. Ibid.; Brunner et al. 1979; Auhagen and Sukopp 1983.

33. The term "ally" is here used as in Latour (1987), as referring to somebody or something that is enrolled as a supporter of, or participant in, a collective project or network, and who or which thereby contributes to its formation and stablization.

34. For a similar analysis, albeit from a later time period in Stockholm, see Ernstson and Sörlin (2009).

35. Arbeitsgruppe Artenschutzprogramm Berlin 1984.

36. See Lachmund (2013, chap. 5).

37. Robert Shaw, interview with author, May 3, 2015. For a description of the project see also Nomadisch Grün (2012).

38. For example, Reynolds 2008; Müller 2011; Kotte 2012; Nomadisch Grün 2012; Rasper 2012.

39. New urban gardening and agriculture have also become the focus of social science analysis. See, for example, the special issue of *Local Environment* and its introduction by Certomá and Tornaghi (2015). Studies that have focused on Berlin are Jahnke (2007), Rosol (2006, 2012), and Bendt, Barthel, and Colding (2013).

40. Meyer-Renschhausen 2011; see also Kahlki (2008).

41. Reynolds 2008. For an empirical analysis of guerrilla gardening in action see Adams and Hardman (2014).

42. Nomadisch Grün 2012.

43. In this section I rely partly on observations made during visits to these urban gardening spaces in the summers of 2013 and 2014.

44. The 2010 “Strategy Urban Landscape Berlin” refers to “community gardens,” “intercultural gardens,” and “guerrilla gardens” as valuable elements of urban green in Berlin. Strategie Stadtlandschaft Berlin, http://www.stadtentwicklung.berlin.de/umwelt/landschaftsplanung/strategie_stadtlandschaft/download/Strategie-Stadtlandschaft-Berlin.pdf (accessed September 30, 2018).

45. See, for example, the rules and conditions for tree pit plantations in the district Kreuzberg-Friederichshain: “Baumscheibenbegrünung” [Tree pit planting], http://www.berlin.de/ba-friedrichshain-kreuzberg/verwaltung/org/natur/baumscheibenbegrnung.html (accessed September 30, 2018).

46. Stattbau n.d.

47. A notable exception was the campaign against the abandoning of the “Prinzessinengärten” in 2012. See “Wachsen Lassen: Die Kampagne” [Letting grow: The campaign], Prinzessinengarten, http://prinzessinnengarten.net/de/der-garten-und-die-stadt/kampagne-wachsen-lassen/ (accessed September 30, 2018).

48. An example of how activists promote their gardens explicitly as a means to cultivate citizen knowledge is their collective book project *Wissen wuchern lassen* [Letting knowledge sprawl] (Halder et al. 2014), which covers learning processes and their results from various Berlin gardening projects. For an empirical analysis of knowledge acquisition in Berlin community gardens, see Bendt, Barthel, and Colding (2013).

49. Bendt, Barthel, and Colding 2013.

50. Nomadisch Grün 2012, p. 25.

51. June 20, 2011, “Gartenalltag Archiv,” Rosa Rose Garten, http://rosarose.twoday.net/topics/Gartenalltag/ (accessed September 30, 2018).

52. See Lachmund (2013, chap. 2).

53. For example, as part of the various district management schemes (*Quartiermanagement*) which seek to activate residents to participate in such projects. See, for example, “Neu bepflanzte Baumscheibe” [Newly planted tree-pit], Quartiersmanagement (District Management) Brunnenviertel-Ackerstrasse, http://brunnenviertel-ackerstrasse.de/Baumscheibe (accessed September 30, 2018).

54. Müller 2011, p. 9.

55. Video, “Gartenbewegungen in Berlin” [Gardening movements in Berlin] at Rosa Rose Garten, http://www.rosarose-garten.net/videos/ (accessed September 30, 2018).

56. Ibid.

57. All points mentioned in ibid.

58. Nomadisch Grün 2012, p. 122.

59. Anonymous 1990.
60. For example, Müller (2011).
61. Macnaghten and Urry 1998.
62. Hård and Misa 2008.

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IV Technological Natures

10 Elbows over the Fence: Rondevlei and the Invention of Community-Based Conservation in Apartheid Cape Town

Lance van Sittert

Sites of landscape preservation, by virtue of their artificial maintenance in states of suspended animation over long periods of time, act as cultural middens, concentrating and condensing the changing ideas, actions, and conflicts of the surrounding society into deep layered archives from whose stratigraphies different histories can be read. Historians in South Africa have focused almost exclusively on such rural preservation sites.[1] The few who have looked at urban sites have concentrated on mountain prospects.[2] Rondevlei (Round Lake) on Cape Town's False Bay shore offers a corrective to the rural and urban montaine biases of the extant scholarship.

More importantly, Rondevlei was the site where the practice of what became known post-apartheid as community-based conservation was invented. This represented a dramatic departure from the old established practice (inherited from the colonial period) of the complete exclusion of communities surrounding protected areas by means of fencing and paramilitary policing (fortress conservation) and sought to win popular acceptance of reserve areas by integrating the surrounding underclass communities through a combination of controlled access, managed exploitation, and environmental education.[3] The long-term sustainability of fortress conservation was a ratio between the size of the protected area and that of the surrounding underclass population: the smaller the former and larger the latter, the greater the pressure on the fence and its defenders. This ratio was least favorable in urban areas and nowhere more so than at Rondevlei, 290 hectares embedded in a ghetto population of fifty thousand people by the 1970s.

The reserve area to abutting proletariat ratio was a necessary but not sufficient condition for the reform of fortress conservation. Most often the urban fortresses were abolished when the ratio shifted decisively in the latter's favor. To avoid this looming fate, the new warden appointed in 1974, Howard Langley, who had trained as a field ecologist in Zimbabwe at the height of the liberation war and had seen firsthand the logical end point and futility of fortress conservation, decided to open his fortress to the surrounding proletariat. He was able to make this radical break with the practice of fortress conservation only because of the already terminal nature of his small, marginal, urban reserve, but the success of his initiatives saw them exported across the national reserve system after the end of apartheid.

The remnant urban nature enclosed at Rondevlei, located as it was in the midst of apartheid Cape Town's emerging ghetto archipelago, modeled the conditions that would face all protected areas post-apartheid. It was thus an accidental laboratory for the subsequent reform of fortress conservation more than two decades later, when the end of apartheid disarmed it and generalized Rondevlei's conditions to the system as a whole. At that point the philosophy and practices Langley developed at Rondevlei were energetically exported and eagerly adopted throughout the national system, and Langley was elevated to the very highest levels of national conservation management. Rondevlei is thus a corrective to the prevailing view of urban nature as of only aesthetic or ironic interest. While it is certainly true that urban nature reflects the class composition of the city, it also often prefigures future challenges to the inherited colonial system of "nature reserves" as a whole and in that way serves, just as Grove argued island colonies did during the period of European colonial expansion, as laboratory sites in which new strategies and tactics can be developed in the war of position that is conservation.[4]

Preserving the Cape Flats

At its moment of preservation in the mid-twentieth century the Rondevlei Bird Sanctuary was located on the frontier between the expanding city and its rural hinterland on the sandy isthmus called the Cape Flats (see figure 10.1).

The eastern wild edge of the city had already been extensively re-engineered over the previous half century in a Clementsian succession toward urban space first by state foresters and then municipal road builders and property speculators. The colonial state forestry department was also engaged in extensive urban "drift sand operations" to arrest coastal dune notably Sukopp, promoted urban ecology as a practically oriented planning science. He posited that urban spaces were living spaces or biotopes, which hosted various plant and animal species, often even more than rural landscapes. At the same time, however, he warned that nature in the city was endangered by intensifying urban development and that measures should be taken to integrate nature promotion systematically into the planning process. He and other ecologists argued that nature in the city should be preserved not only for its own sake, but also to create better conditions of life for urban citizens.[32] Regular contact with natural environments was considered necessary for city dwellers and even a prerequisite for the healthy development of children. Equally important, the existence of nature in the city was also considered as a means to strengthen other components of the urban ecosystem, such as the quality of the air, soil, and water supply. Although similar arguments had been presented in earlier writings on urban green spaces and garden cities, the argument was now reframed in bio-ecological terms. In particular, since the 1970s, the term "biotope," which denotes a topographical area in which specific biological populations live, has become a political catchword that has penetrated deeply into public consciousness.

Among the allies who sponsored ecologists' agenda, landscape planners and urban environmental activist groups were salient.[33] Evolving from the traditional field of *Landespflege* (landscape care), which had been based largely on a horticultural approach, the new field of landscape planning established itself as a problem-solving discipline, based on ecological research. The profession expanded through the provision of new academic education programs, the largest of which was at TU Berlin. The department of ecology provided teaching for this program. Hence, the new generation of landscape planners passed Sukopp's courses, acquired theoretical and practical skills in urban ecology, and largely adopted a commitment to protecting urban biotopes. Often these planners found jobs in Berlin's public administration or as independent consultants, and thereby became important multipliers of ecology's tenets in urban politics.

A notable difference between the biotope protection regime and the earlier organic one is the convergence of expert-based policymaking with an actively participating citizenship. The spectrum of civic activism in West Berlin ranged from traditional, often politically conservative nature conservation organizations, to middle-class neighborhood activist groups—the

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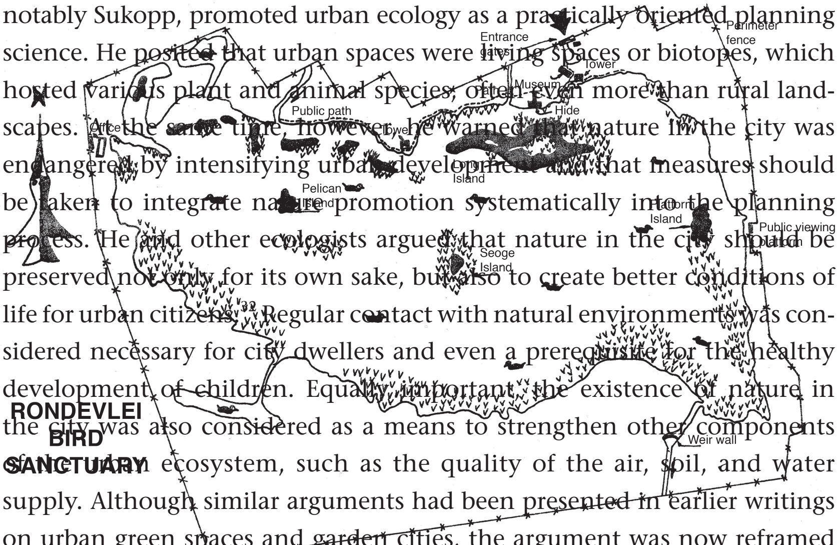

Figure 10.1

Rondevlei Bird Sanctuary, ca. 1978. The map is from C. H. Langley, *Rondevlei Bird Sanctuary: An Introduction to the Rondevlei Bird Sanctuary with Check Lists of Birds and Other Animals Recorded since 1952* (Cape Town: Divisional Council, 1978, p. 1). Rondevlei is located on Cape Flats, some twenty kilometers southeast from the historical city center of Cape Town, an extensive flat sheet of aeolian sand to which the Apartheid regime forcefully moved non-White classified people from the 1950s to the early 1990s.

fields around major coastal centers preparatory to settlement. The Cape Town municipality initiated the process on the Cape Flats in the 1880s to protect its transport infrastructure and open up the area for settlement, and by the beginning of World War I the department of forestry had planted more than twenty-five square kilometers with exotic pines, wattles, and eucalypts.[5] At its Strandfontein plantation on the city's False Bay shore, begun in 1898, some ninety hectares of drift sands had been "fixed" in this way, tripling to 280 hectares by 1950.[6]

Road builders and property speculators came in the wake of the foresters. The city council constructed Prince George's Drive to open up the area for settlement. Two speculators, John Marshall Joyce and Alexander McGregor, trading as Marshall and McGregor, developed townships along the main road across the Cape Flats in the 1900s.[7] In 1916 they established the Cape and Transvaal Land Finance Company to do the same along Prince George's

Drive on the city's reclaimed False Bay shore. To enlarge its landholding, the company aggressively reclaimed wetlands in its domain by infilling, except where the wetlands provided a recreational attraction conducive to residential development. Thus at Zeekoevlei adjoining Rondevlei the company assisted the establishment of a yacht club in 1932 and sold land to a growing community of yachtsmen. In this way the land around the vleis was gradually transformed in the interwar period into a combination of residential and small-scale agriculture, with a growing number of the latter engaging in squatter farming.[8]

This was the Cape Flats that the promoters of a sanctuary at Rondevlei and their first warden sought to preserve in the mid-twentieth century. The best way to do this, they believed, was to fence the vlei and then leave it more or less alone. The purpose of conservation was to keep all outside influences to a bare minimum, freezing the vlei at a point in time when it was imagined to still be more of a natural than a cultural artefact and human traces were light enough to be effaced over time by what were imagined as the inherent restorative capacities of a stable and unchanging nature. This view was informed by nineteenth-century romantic sensibility, natural history, and biological cosmopolitanism, which also influenced white amateur ornithology in the city, with its innate appreciation of a summer sunset over a lake, obsession with collecting personal sightings of every member of the local avifauna, and particular affection for exotic migrants.[9]

Alongside its better known affinity for the city's indigenous flora, Cape Town's urban Anglo middle class also harbored an abiding affection for "the feathered tribe of the Peninsula."[10] A member of parliament from the city, Henry Juta, was instrumental in the passing of a Wild Bird Protection Act in 1899, fully five years before an act to protect indigenous flora, and from the turn of the twentieth century on, all wild birds were protected within Cape Town.[11] A quarter of a century later another Cape Town parliamentarian, J. W. Close, was the prime mover behind the first national legislation protecting wild birds.[12] Without an institutional base or cause such as that provided to botany by the South African College and the Kirstenbosch National Botanical Garden, popular ornithology in the city did not take an organizational form until midcentury.[13]

Anglo middle-class ornithology did, however, inform the activities of the city's Mountain Club and its Botanical Society, and it benefited too from the introduction of biology as a subject in the school curriculum by the provincial education department in 1921.[14] This broad popular interest inspired the Mancunian Leonard Gill, appointed director of the city's South African Museum in 1924, to produce his *First Guide to South African Birds*, lavishly illustrated by his sister, in 1936.[15] As he explained in the preface, "Year after year, one of the commonest inquiries addressed to us at the South African Museum has been for an introductory work on the country's birds. Something small in compass, at small cost, and with abundant coloured figures seems always to be the desideratum."[16] Gill's book, which went through five editions over the next twenty years, followed in 1940 by Austin Robert's *The Birds of South Africa*, unleashed a "quite startling … flood tide of interest in bird life."[17] This "flood tide" also floated new popular ornithological organizations in the immediate aftermath of the World War II, including the Witwatersrand Bird Club in 1947 and the Cape Bird Club (CBC) the following year, both of which became branches of the professional South African Ornithological Society (SAOS) in 1950.[18]

It was no accident that the CBC was conceived on "the lonely and rugged Swartklip dune landscape on the False Bay shore … sitting on a huge dune, overlooking a peaceful small vlei."[19] The Cape Flats had been the focus of Anglo middle-class popular ornithology in the city throughout the interwar period. In 1918 Gill's predecessor as director of the South African Museum had pointed the city's amateur ornithologists to the eastern "fringe of 'the Cape Flats,'" which he predicted, "if carefully watched over will doubtless considerably increase the number of birds … recorded."[20] Gill agreed, deeming the Cape Peninsula itself "almost everywhere poor in bird life" apart from the seashore and vleis of the Cape Flats.

> The vleis (shallow lakes and marshy ground) provide an exceptionally interesting feature of the local bird life. Pelicans, Flamingos, Avocets and Stilts are often to be found, sometimes in large numbers, on one or more of the vleis. Ducks of several kinds are often abundant: Pochard, Yellow-bill and Cape Wigeon the commonest; Redbill, White-backed Duck and Shelduck less regularly seen. The smaller waders are generally to be seen by the hundred (except during three or four months of winter) along the edge of the water, arctic and European species like the Curlew Sandpiper, Little Stint and Ringed Plover far out-numbering the indigenous kinds.[21]

The founders of the CBC were among the many who followed the direction of the city's professional ornithologists and by 1948 were alarmed at the wartime transformation of the area. To enable the construction of a new military airfield, a large swath of the Cape Flats along the False Bay shore was drained, thereby also desiccating many vleis and altering the water level and flow in those that remained.[22] The city's booming wartime economy also lead to a massive influx of rural migrants, many of whom squatted on the Cape Flats and supplemented their wages or subsisted by keeping livestock and harvesting wood, flowers, game, and wild birds.[23] The resulting rapid disappearance of wetlands, flora, and fauna from the Cape Flats during the war spurred white middle-class amateur and professional ornithologists newly organized in the CBC-SAOS to take urgent action.

The now retired septuagenarian Leonard Gill, newly elected honorary president of the CBC, lamented that, "nature has to go down before man nearly everywhere; it is only here and there that a bit is set aside to show later generations what the world was once like."[24] Rondevlei was one such fragment, he declared, "a splendid natural feature of the neighbourhood of Cape Town," whose "complete disappearance would be highly regrettable—in fact a tragedy in natural history."[25] In addition to the vlei, Gill urged that what was required was a "buffer zone" around it "to keep the ever-multiplying buildings from coming so near as to spoil it," a fence "to check the ever increasing disturbance which is gradually driving the best birds away," and "a permanent watcher to exercise a general protection."[26] The resort to fortress conservation in the classic colonial mode reflected the extensive imperial service of professional ornithologists in the city in the third quarter of the twentieth century.[27]

The same model informed the "nature reserves" that had proliferated in the city and its hinterland in the 1930s, with the Table Mountain massif being converted into a nature reserve in 1931–1932, wild flower reserves being proclaimed in five neighboring rural towns in 1933–1935, and the city and divisional councils purchasing farms on the far southern peninsula to create a local facsimile of the Kruger National Park in the Cape of Good Hope Nature Reserve in 1939.[28] These reserves were part of the city's developing tourist economy as configured by the interwar automobile and road-building revolutions and intended to provide middle-class residents and visitors alike with convenient access to remnant iconic natural landscapes and species on the city's doorstep. They were protected by location either in middle-class areas of the city or in places far removed from public transport. Rondevlei did not fit this purpose, given its location on the Cape Flats among black squatters and adjacent to one of the city's sewerage works and its harboring birds that, unlike the flowers and game conserved in the city's other nature reserves, were highly mobile, making it impossible to guarantee their presence for visitors. Instead of a tourist attraction, the CBC leadership of professional ornithologists presented Rondevlei as an "ornithological field station" and picked Ernest Middlemiss as their first "permanent watcher" over the vlei.

Fortress Conservation: Rondevlei, 1952–1974

Ernest Middlemiss is a forgotten figure in the annals of Cape amateur and professional ornithology, but in the third quarter of the twentieth century he was the embodiment of its guiding ideas and aims.[29] English-born Middlemiss, a self-taught naturalist, artist, journalist, and minor literary figure, epitomized the amateur tradition of both Cape Town popular and professional ornithology at midcentury.[30] This tradition valued practical experience over professional training. Middlemiss with his wife moved in as warden of Rondevlei in January 1952, together with a black patrolman as their Man Friday.

The barbed wire "security fence" erected in 1951 was Middlemiss's abiding concern owing to the rumored resentment of the surrounding black population at Rondevlei's enclosure.[31] They were, he claimed, people "of a type to which the concepts and practices of protection of animal and floral life is enexpressibly [*sic*] alien, and probably incomprehensible" and who had before "systematically plundered" the sanctuary.[32]

> Horses and cows tramped and grazed the veld, woodcutters made inroads into the stands of acacia trees and both adults and children exploited the area for its flowers and decorative foliage. Nests were robbed particularly those of wildfowl (one resident commented on "sackfuls of duck eggs" being taken), birds were trapped, fish were speared and illegal shooting took place. . . . Dogs roamed the area at will.[33]

Middlemiss and his black retainer thus maintained a "never-ceasing vigilance" in order to keep the sanctuary "inviolate" against invasion by the neighboring "pondokkie population," the patrolman making daily and the warden monthly "close inspection" of the fence to check and repair its integrity.[34] In the first year Middlemiss reported that the fence had been opened twice and some of its barbed wire stolen, and that "though exceptionally well fenced, the Sanctuary is extremely vulnerable" because, "it is impossible to keep a constant watch over the entire area and, owing to the dense bush trespassers could climb the fence unseen at only a few hundred yards."[35]

Trespass in the sanctuary increased with the increase in the area's poor black population. The development of a low income housing scheme on the sanctuary's northeastern boundary in 1956 increased the surrounding population and created "an insatiable demand for firewood and consequent devastation of all nearby trees."[36] Similar development followed over the next two decades as the municipality reorganized the city into apartheid "group areas" and used the Rondevlei area as a dumping ground for "coloureds" who were forcibly removed from "white group areas" of the city. By the early 1970s Middlemiss estimated that "the density within a one-mile radius has, since 1952, increased many hundredfold" and that thirty-thousand "coloured[s] of a low standard" were now living along the sanctuary's fence line "figuratively standing with their elbows over the fence."[37]

While flower-picking and wood-cutting were at most a "nuisance," arson posed a direct threat to the sanctuary. "A planned act of vandalism could destroy by burning, the vegetation over the greater part of the sanctuary," Middlemiss warned.[38] The southern boundary, being uninhabited and directly in the path of the prevailing summer winds, was particularly vulnerable.

> The dunes south of the Sanctuary…seem to hold an irresistible appeal to vagrant persons and especially on Saturdays and Sundays. In this quiet area drinking, drug smoking and hunting with dogs takes place and, almost inevitably the starting of veld fires. During the dry summer months, when the south-east wind blows in over False Bay, a weekend seldom passes without a fire burning in the five kilometre stretch between the fence and the sea.[39]

Twice during Middlemiss's tenure, in 1959 and again in 1973, weekend arsonists' summer fires breached his fence line and burned substantial tracts of the reserve.[40]

To counter the growing threats of trespass and arson, Middlemiss sought to improve surveillance within the sanctuary by clearing bush along the fence and cutting paths encircling the vlei.[41] In 1954, two twenty-five-foot "observation towers" and a "bird observation hut" were added, providing aerial and concealed vantage points from which to watch for human trespassers and fires as well as birds (see figure 10.2). The following year

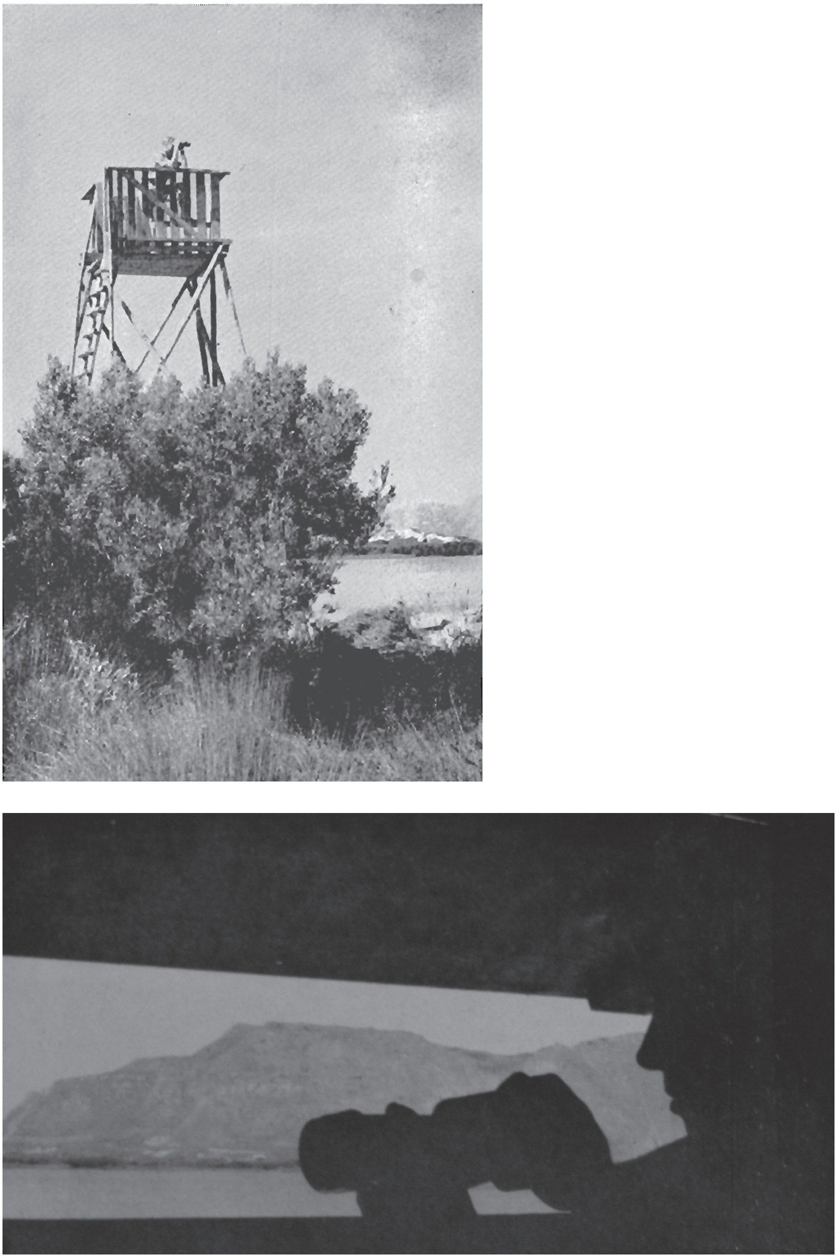

Figure 10.2

Fortress conservation. The observation tower (*top*) and the observation hut (*bottom*) at Rondevlei, ca. 1954. Photos are from the Cape Divisional Council's *3rd Annual Report on the Rondevlei Bird Sanctuary for the Year Ended 1954* (Cape Town: Cape Divisional Council, 1954), pp. 3 and 8.

the divisional council cut a fire break inside the southern, eastern, and western boundary fences. By the mid-1960s the "pressure from illegal woodcutters…especially during the winter months" necessitated "night patrols" of the sanctuary, and when these failed to apprehend the culprits, Middlemiss acquired a "trained guard dog" to assist in "maintaining security in the Sanctuary." He noted with satisfaction that "the local people knew of its presence and were reporting among themselves that the dog roamed the sanctuary at will at night."[42]

When the divisional council allowed the public free entry to the sanctuary on weekends starting in 1970, Middlemiss reported that "the promise of untold delights—all illusory—to be found within the Sanctuary's fence attracted hordes of local youth. After one or two sad and sobering experiences they were turned away and well before they were able to show their only interest in birdlife…as to whether it was edible or not."[43] Thereafter Middlemiss instituted a practice of "judicious thinning out of would-be juvenile visitors" on weekends to ensure that local black youth were "sent back down the road" rather than admitted to the sanctuary.[44]

The purpose of the sanctuary's fortress of fences, paths, observation towers, hides, fire breaks, and patrols was to create an environment free of "disturbance" or "interference" within which "to study the birds in relation to the environment." "It is only under such conditions," Middlemiss declared, "that observations on birdlife can reflect natural habits, rhythms and behaviour."[45] He accordingly initiated a wide-ranging program of daily environmental measurements and "census work" in 1952.[46] To enhance the visibility of the sanctuary's bird population to surveillance, Middlemiss interfered extensively in its natural environment. In addition to bush-clearing, path-making, and the construction of observation towers and a hide, he erected perching platforms, anchored a raft, cleared sedge beds, and bulldozed artificial islands and bays in the vlei to make the waterbird population more "legible" to his census work.

Most dramatically in 1958 the water level in the vlei was lowered to increase the available environment for migrant waders and the availability of all water birds for Middlemiss's "census work." Ironically, the re-engineering of the water level initiated a cascading regime change in the vlei; the collapse of algae, sedge, fish, and dominant waterbird populations (herons, ducks, and migrant waders) in the 1960s and the advance of bulrush and an invasive alien marsh grass, *Paspalum vaginatum* into the vlei led to its accelerated silting up in the 1970s. As Rondevlei disappeared around him, Middlemiss took refuge in his longstanding ambition, the sanctuary's own field museum, named in honor of the CBC's first president and his patron, Leonard Gill, and opened in 1966. Here at least, if nowhere else in the sanctuary, Middlemiss had complete control over Rondevlei's birdlife and, through the taxidermist's art, was able to put on permanent display inside species that were rapidly disappearing in the sanctuary outside. He doggedly refused to take any responsibility for the crisis in the sanctuary, and instead deflected blame onto the public in general and the surrounding black population in particular.

Middlemiss was always reluctant to allow public access to his sanctuary, and Rondevlei was opened only in 1955, five years after it was established. Would-be visitors were required to apply for a permit to visit, which Middlemiss limited to fifteen a day.[47] He further restricted public access to just half the year and to one kilometer of the north shore.[48] In this way he was able to keep "sightseer" numbers under a thousand a year until the 1970s (see figure 10.2). In 1970, however, the divisional council decided to allow free public access on weekends during the open season, and the number of visitors quadrupled to an average of four thousand per annum in the first half of the 1970s.[49] While Middlemiss was able to limit the white public's growing "disturbance" to the north shore and exclude the local black population entirely, he nonetheless claimed that the latter, in addition to trespass and arson in the inner sanctum, were also responsible for "toxic substances…being carried into Rondevlei by polluted waters from the neighbourhood." Regular testing of the vlei water began in the early 1970s, but failed to find Middlemiss's mystery toxin.[50]

Middlemiss's fortress conservation demonstrated his obsession with protecting the vlei against any and all forms of human "disturbance":

> It is an area where the fauna and flora have been left untouched; where the insects, reptiles, amphibians, the birds and the mammals live a life undistorted or disturbed by any interference, which could be of a destructive nature or cause discord. It is a true Sanctuary in every meaning of the word where one is conscious of nature's harmony and congruence.[51]

To maintain this "harmony and congruence," Middlemiss regarded it as "imperative…to step exceedingly warily" and accordingly followed what he deemed "the most valuable and wise policy…to wait and see, and to let nature shake off the past influences and see what it could do for itself." This manifested in an "obdurate policy of non-disturbance and non-intervention" and innate hostility toward any form of "management" of the vlei. The latter antipathy was shaped by his experience of the "ill-advised and disadvantageous" lowering of the vlei's water level in 1958.[52] "Man's attention and actions are more often than not confined to a solitary facet of the Sanctuary and they cannot, in pursuing a programme, see and distinguish the hundreds of other facets, all equally or more important than the one they are planning to alter. Aims, including those of the technical professions, are not always united with reason."[53]

By the 1970s, as he watched the "natural history" of his generation being supplanted by the "technical profession" of "conservation management" based on "the magic word ecology," Middlemiss feared a new determination to "interfere" with "nature" at Rondevlei. The latter he stressed was now "a relict, a record of the past and one struggling to retain its character and the life it holds" and for this reason, "will rely … , more than ever, on remaining untouched, unimproved, and without any form of interference."[54] "There should be no tendency to favour or to concentrate exclusively on any one of the systems which build up the ecosystem of this supremely valuable environment."[55] Faced, contrary to his romantic imagining, with nature's manifest "disharmony" and "incongruence" at Rondevlei, Middlemiss proposed to do nothing in the hope that the vlei would regenerate itself. By the mid-1970s it was clear to everyone except the warden that his "obdurate … non-intervention and non-disturbance" were authoring the destruction not the regeneration of Rondevlei.

Community-Based Conservation: Rondevlei, 1975–1994

Middlemiss finally retired as warden of Rondevlei in mid-1975, along with the rest of the generation of nascent professional ornithologists who organized and lead popular ornithology in postwar Cape Town and presided over the collapse of Rondevlei.[56] He was replaced by a twenty-six-year-old "game ranger," Howard Langley.[57] Langley had grown up in the Fish Hoek valley near the southern tip of the Cape Peninsula and was appointed a ranger in the city's flagship Cape of Good Hope Nature Reserve in 1968 straight out of high school. In the early 1970s Langley successfully completed a two-year field ecology course at the then University of Rhodesia in Harare; it was designed for the elite rangers of the then Rhodesian Parks Board who were directly involved in fighting a counterinsurgency war against Zimbabwe's black nationalist movement.[58] Langley's youth, innate rebelliousness, and practical ecology training soon led to an escalating conflict with his superior at Cape Point over the management of the reserve, and the divisional council transferred him to Rondevlei to resolve this problem.

Langley, a self-described "futurist" and avid science fiction reader, had no time for Middlemiss's sentimental nostalgia for the lost Cape Flats of his youth. "I think the past can't be undone. I know people say you can learn from the past, but I don't believe that too much. But we can learn from now and we actually really have to know what's going to happen and try and predict what's going to happen … because it's the future we're going to leave behind, not the past—its already left behind."[59] Looking to the future, Langley saw the absolute necessity of "public buy-in" to Rondevlei if it was to survive the accelerating urbanization of Cape Town. "Grassy Park was just growing like you cannot believe—roads and new buildings and the Regional Council of the Cape [*sic*] was just building and it was just going crazy. … I said Rondevlei's got no future; unless we change what these places are and make them of much greater value to communities … we're going to lose them!"[60]

Langley thus broke decisively with his predecessor in actively encouraging public entry to Rondevlei. Middlemiss was a misanthrope, who at best tolerated and worst despised the "spectacle-hungry crowds quite unashamedly seeking something to see" as a "disturbance" and doggedly restricted their access to the sanctuary.[61] As Langley observed in 1980, "Rondevlei is located within a metropolitan area populated by some one and a half million people, yet only just over 4,000 persons visited the sanctuary this year, many of these being upcountry visitors."[62] In addition to a range of logistical obstacles, Langley attributed this "disturbing lack of interest … by the local population" to Middlemiss's quarter-century policy of restrictions "aimed at almost discouraging public use of Rondevlei … which did much to harm … [its] public image."[63] Langley believed that the construction of a new freeway skirting the sanctuary as the main access route from the city to the False Bay beach resorts would obviate many of the logistical constraints on its public use and so set about enhancing "the general appeal of the Sanctuary to the man in the street."[64]

To this end the permit system, the half-year closed season, and the restrictions on photography were scrapped, an information booklet produced, and the reception area landscaped, including a pond stocked with pinioned water birds "to give the visiting public an opportunity of seeing and photographing at close quarters, many species of birds that they would normally only see at a distance in the Sanctuary."[65] Langley understood the public demand for spectacle and, unlike Middlemiss, actively sought to encourage and accommodate it at Rondevlei. He constructed new islands, bird hides (including one where birds were fed), artificial roosts, and another observation tower to guarantee sightings for visitors. His determination to curtail the bulrush invasion was also largely an aesthetic concern about its screening of the vlei from visitors.

These many innovations, coupled with the rehabilitation of the vlei's bird population, produced a spectacular growth in visitor numbers after 1980 (see figure 10.3). In addition to the general improvements, two specific strategies underpinned the spectacular growth in visitor numbers under Langley's tenure: the introduction of charismatic species and targeting of schools for "environmental education." The reintroduction of hippo in 1981 generated "vast public interest" through press, radio, and television and guaranteed enduring media publicity thereafter (as discussed further

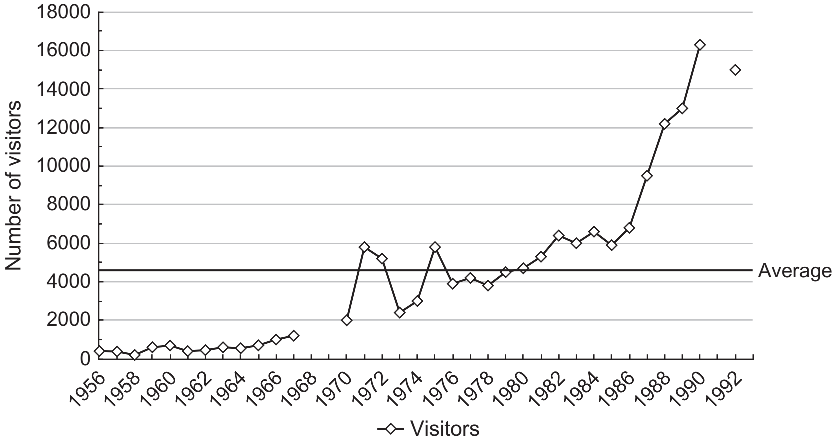

Figure 10.3

Rondevlei public visitors, 1956–1994, compiled from data contained in all twenty-four existing annual reports on the Rondevlei Bird Sanctuary from 1952 to 1988 (Cape Town: Cape Divisional Council, 1952–1988), with no visitor's data for the first four years, and complemented with data from 1990 and 1992 from the Western Cape Regional Services Council (n.d.).

below).[66] More important, though, in sustaining long-term growth was Langley's development of Rondevlei as a centre of "environmental education" for city schools.

Noting in the mid-1980s that "most schools that visit the Sanctuary use it simply as a recreational outing, with pupils learning little about the ecology or purpose of such a nature reserve," Langley set about remedying the situation through the complete renovation of Middlemiss's field museum.[67] Critical of the displays of "large groups of birds mounted on boards with their names below, which serve only as an aid to identification," he supplemented them with "educational displays" in "the form of natural habitats, with each bird or animal displayed in its natural setting and carrying out some function" to enable visitors to "identify the bird in the field but also to see to some extent what role it fulfils in the ecosystem."[68] He also renovated and extended the museum building, added a lecture theater, and developed a series of "audio-visual lectures" on the sanctuary in both English and Afrikaans and an educational guide with worksheets for schools.[69] The captive school audiences were critical to sustaining the sanctuary's growth in visitor numbers particularly in the late 1980s, when "political unrest" and the imposition of a state of emergency in the area led to a sharp decline in adult visitors.[70]

The other barrier to entry at Rondevlei that Langley removed was the fence erected to exclude the burgeoning ghetto population in its immediate neighborhood from the reserve. To Langley, "as soon as you make a rule, you're putting up a fence—that's what you're doing. It doesn't matter if it's a barbed wire fence or a rule or something. And rules don't create compliance, we know that; this country is one of the most lawless countries in the world and we're full of laws and everybody breaks them all the time. You have to manage them and manage the process."[71] The ghetto public's primary interest in the reserve was economic. Instead of suppressing their firewood poaching, as Middlemiss had done, Langley harnessed it to his cash-strapped rehabilitation effort as free labor:

> So I had no money and no budget so I thought, well I've got all these guys coming in illegally and climbing over and trashing our fence, climbing through the fence and cutting the fence to come and cut our firewood. I'm going to organise them and tell them they can come and cut up the firewood, but I will manage the process. I'll even put in a gate for you, I'll give you a bloody key and you can come in and you can cut the firewood where I tell you in blocks. And when you've

> finished this section, I'll let you go into the next block, the next block, the next block—because I want you to clear the reserve of invasive trees—so that's how I did it—and I managed to clear the whole reserve of alien vegetation just using locals; they all became my friends, because then they in the end were protecting their own resources—Some of the woodcutters there were like the mafia.... They were stopping people coming in and trashing—because it was their resource—which was a serious lesson for me to learn, because I learned in the process. And by the way I had to go through a sifting process because some people just didn't comply, so we said, you lose your permit—if you don't want to comply with the privilege we give you of coming to harvest firewood here, I'm sorry you're going to lose it. And we would give them a third warning and that's it gone. And then these guys would stop those guys coming in; I didn't need to police them, so it worked really well.[72]

It took Langley a decade to clear the reserve of alien acacia this way, and by removing the main incentive for local poaching, he secured a new peace between the reserve and its neighbors. Langley claims that he would have gone further and put styles over the fence or removed it altogether, but his importation of hippo to Rondevlei necessitated its enhanced armoring with cable and then welded mesh to prevent the animals from escaping. [73] The presence of a growing herd of large, aggressive nocturnal herbivores also acted as a powerful deterrent on local bush meat hunters and their dogs, while Langley's reduction in the resident grysbok and porcupine populations in the late 1980s removed their main quarry.[74]

Within the reserve Langley dismissed his predecessor's practice of "allow[ing] nature to run its course," as "no longer valid or practical" because Rondevlei was "no longer... a natural system."[75] Instead he sought to rehabilitate as much of the natural system as possible by reintroducing two key elements deliberately excluded by Middlemiss's fortress conservation, fire and grazing, in order to control the *Paspalum* and bulrush invasions that were converting the vlei into a marsh. Langley estimated that the vlei would take just thirty years to silt up and completely disappear in summer, thereby and so "bringing about the final end of Rondevlei as a Bird Sanctuary."[76] The "cancerous spread" of *Paspalum* had, by the mid-1970s, "claimed the entire shore of the vlei, spread out into the shallower areas forming dense carpets and destroyed all available sand and mud areas that are vital to water birds" and constituted "the greatest single threat to the Sanctuary's future."[77] After all attempts at manual, mechanical, and chemical eradication of the "thick carpets of... virile grass" had failed, Langley proposed what he called "the last hope," the reintroduction of hippopotami to Rondevlei:[78]

> It is hoped that when introduced to Rondevlei, they will not only control the spread of P vaginatum, but will generally improve the area for birds, by creating channels in the dense reedbeds that are rapidly becoming established in the vlei and create mud banks and wallows, that could be utilised by a wide variety of water-birds.[79]

Langley's first hippos, two young bulls donated by the Natal Parks Board, arrived at Rondevlei in 1981, "the first of their kind to set foot in the Cape Peninsula in over three hundred years."[80] They were followed by two hippo cows in 1983, and the first hippo calf at Rondevlei was born the following year.[81] The hippo re-engineered the vlei in exactly the way Langley predicted they would. "The extent to which they are grazing back the encroaching grass…is greater than was thought possible for only two animals," Langley reported within a year of the first arrivals. "There is now no doubt that…the hippo will in the long term bring about and maintain suitable wader habitat at Rondevlei."[82] They were in fact so successful that by the mid-1980s they had eliminated *Paspalum vaginatum*, thus creating a severe shortage of grazing material, which necessitated the sale of two hippos in 1988.[83]

Langley coupled his reintroduction of grazing with that of fire, the human "disturbance" Middlemiss had worked hardest to suppress at Rondevlei.[84] In the second half of the 1970s Langley had all "alien acacia" eradicated from the sanctuary and tethered goats to supplement the resident grysbok in grazing down the vigorous regrowth of seedlings that followed clearance.[85] With the major fire hazard in the sanctuary removed he initiated the selective burning of bulrush beds, "to reduce the density of old well-established reed-beds and to eliminate the annual build-up of decaying reed stems" and thereby opening them up again to use by birds. He also burned *Paspalum* in such a way as to concentrate the hippos' grazing in the public area along the north shore where he most wanted to attract waders for visitors.[86]

As well as rolling back the *Paspalum* and bulrush invasions Langley implemented a suite of other measures to enhance Rondevlei's attractiveness to water birds and hence visitors. He erected some of the largest acacia felled in the sanctuary in the vlei supplemented by brush piles as nesting sites. To the same end he fired and felled the dense vegetation cover on the many islands created by Middlemiss and built more islands of his own. The

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Figure 8.1

Mangarbani's *dhau* forest with Gudariya Baba's shrine. Photo by Pradip Krishen.

descended on it most recently have left behind smelly heaps of dirty Styrofoam plates. Although the temple's growing precincts pose a problem in this pristine area, there is an even bigger issue at stake, one that threatens the very existence of Mangarbani.

Mangarbani and its surrounding land used to be the *shamilat deh* (commons) of Mangar, Bandhwari, and Baliawas villages,[5] settlements dominated by the Gujjar caste, with about three thousand landowning households. Since precolonial times, the *malikan deh* (proprietary body of a village), which consisted of all landowning households represented through village *panchayats* (local councils), controlled these forests, grazing lands, and ponds. In revenue records, the commons were classified as *ghair mumkin zameen* (uncultivable land) and therefore exempt from agricultural tax. Landless households in the village belonging to the Scheduled Castes (former Untouchable castes who cleaned and disposed of human waste and animal carcasses) had rights to collect firewood and fodder from these commons only at the pleasure of their upper-caste landowning patrons, as did agricultural tenants. In the late 1970s, the governments of Haryana and Uttar Pradesh states and the Union Territory of Delhi began carving sanctuary's growing gull and mongoose populations were also aggressively culled to lessen their predation pressure on nests.[87] Langley's bold management interference produced rapid results in the form of a steady and sustained recovery in wader and water bird breeding populations at Rondevlei, including the reestablishment of its renowned heronry in 1981, a quarter century after its disappearance.[88]

The hippopotami also provided Langley with a powerful argument for not only maintaining, but also expanding the sanctuary. By the mid-1980s the hippo grazing crisis had become acute, and Langley warned of an impending "tragedy": the re-extinction of hippo "after returning … to an area where they had been extinct for over 200 years and where there [*sic*] presence is essential for the well-being of the aquatic environment."[89] This was a result, he declared, of the "unfortunate mistake" made in 1950 of placing "too much emphasis … on preserving the vlei itself" and not enough on the "terrestrial environment of the area" even though the two were "closely interrelated … and one cannot be adequately conserved without the other."[90] As a result, the sanctuary was"of insufficient size to be ecologically viable," and to enhance its viability Langley was allowed annex more than one hundred hectares of public land adjoining the reserve, which had been earmarked for schooling, as grazing land for his hippo, nearly doubling it in size.[91]

Conclusion

Fortress conservation was reinvented at Rondevlei in the final two decades of apartheid in response to the unique urban pressures faced by the sanctuary-cum-reserve. Its location on the Cape Flats exposed it to aggressive invasion by both exotic vegetation and poor blacks, the former the legacy of environmental engineering by foresters and the latter of the social engineering by apartheid urban planners. By the mid-1970s these twin assaults had destroyed Rondevlei as a bird sanctuary and the credibility of the fortress conservation approach of its first warden, Ernest Middlemiss. Faced with the complete failure of conventional conservation, Rondevlei's second warden, Howard Langley, used its "large open air laboratory" to experiment with a new approach that substituted alliance-building for force to win rather than compel popular consent to the reserve. Langley's eclectic and innovative fusion of scientific ecology and pragmatic futurism redefined Rondevlei's purpose away from "birds" to "nature" and from elite recreation to popular education. By broadening his remit and winning popular consent for this expanded mandate, Langley was able to aggressively enlarge the boundaries of the reserve in the late 1980s, thereby successfully enclosing land earmarked for black education and housing as hippo grazing.

The importance of Rondevlei as the laboratory for the invention of a new kind of urban conservation is confirmed both by Langley's subsequent meteoric rise within the local state to head of Cape Nature in 2001 and by the generalization of his approach to massively expand the city's reserve system post-1994.[92] Langley's reintroduction of hippo to Rondevlei, in particular, powerfully demonstrated that the urban environmental clock could be successfully wound back from five past midnight to precolonial dawn and that by doing so conservationists could successfully claim back scarce urban land from the city's burgeoning poor black population. The consent of the latter to their continued dispossession could in turn be secured through their employment and "environmental education" in the enlarged reserves.

Notes

1. Carruthers 1995; Foster 2008.

2. See, for example, Foster (2008, pp. 144–177) for Johannesburg and van Sittert (2003) for Cape Town.

3. See Berkes (2004) for theory on community-based conservation; Cock and Fig (2000) and Ramutsindela (2004) for its practice in Southern Africa; and Graham and Ernstson (2012) and Graham (2015) for its use in Cape Town.

4. Grove 1996.

5. Union of South Africa 1913.

6. Union of South Africa 1913, tables 5 and 15; 1950, tables 3a and 12.

7. Rosenthal 1980, pp. 4–8.

8. See, for example, Middlemiss (1946).

9. Ibid.; Middlemiss 1974, pp. 4–6.

10. The words of those of the director of the South African Museum, Louis Peringuey, cited in Bolus (1918, p. 66).

11. Cape of Good Hope (1899, pp. 644–645) and Wild Bird Protection Act (1899, No. 42).

12. Union of South Africa 1925, pp. 658–665; Union of South Africa 1926, pp. 115–137.

13. See van Sittert (2002) for Cape botany and Gill (1955) and Carruthers (2004) for Cape ornithology. The South African Ornithological Union was founded by the director of the city's South African Museum, W. L. Sclater, in 1904 but disbanded in 1916; it was then revived as the South African Ornithological Society by the director of the Transvaal Museum, Austin Roberts, in 1929.

14. See, for example, Skaife (1963, pp. 57–67) for the introduction of biology into the school curriculum; Skaife (1920) and Skaife (1928) for popular nature study; and L. M. R. (1946), Bolus (1918), Two Bird-Loving Members (1919, 1920, 1921, 1922, 1923, 1925) and Meiklejohn (1940) for the Mountain Club.

15. See the *First Guide to the Birds of South Africa* by Gill (1936). Gill reported having spent seven years compiling this book.

16. Ibid.

17. See Winterbottom (1981, pp. 180–181) for the number of editions and Gill (1948, pp. 605–606) for the quotation.

18. Cape Bird Club 1998, pp. 3–4.

19. Ibid.

20. Bolus 1919, p. 66.

21. See Gill (1940, p. 202).

22. See de Vries (1991, pp. 192–193).

23. See Sayers (1986), Magona (1990), Greenbank (1993), and Meier (1998).

24. Quoted in Middlemiss (1974, p. 23).

25. Quoted in ibid. (pp. 24–25).

26. Quoted in ibid. (p. 25).

27. See Brockington (2002), Neumann (2002a), and Neumann (2002b, pp. 22–47) for the colonial model.

28. See van Sittert (2002, p. 125) and Skaife (1963, pp. 52–56) for the city's white middle-class agitation for a Kruger National Park facsimile on their doorstep.

29. Cape Bird Club 1998. Middlemiss did not even warrant an obituary notice in the Cape Bird Club journal *Promerops* when he died in 1992.

30. See Winterbottom (1981, 1995) and Cape Bird Club (1998). Even the professionals were amateurs, Gill was trained as a palaeontologist, Winterbottom as an educationalist and Broekhuyssen as an entomologist.

31. See Cape Divisional Council (1952, pp. 4–5). I will make frequent use of the council's first thirty-seven annual reports, which are dated from 195 to 1988 and are grouped together in the References list. See also Gill, quoted in Middlemiss (1974, pp. 24–25).

32. Cape Divisional Council 1952, p. 4.

33. Cape Divisional Council 1971, 1972.

34. See Cape Divisional Council (1972, p. 28). Gill quoted in Middlemiss (1974, p. 23); additional quotations in Cape Divisional Council (1952, p. 6).

35. Cape Divisional Council 1952, pp. 5, 11.

36. Cape Divisional Council 1956, p. 1.

37. See Cape Divisional Council (1972, pp. 25, 54). See also Langley (1978, p. 1), who revised the estimate of the neighboring population upward to fifty thousand.

38. Cape Divisional Council 1952, p. 5.

39. Cape Divisional Council 1972, p. 26.

40. See Cape Divisional Council (1959, pp. 1–2); Cape Divisional Council (1973, pp. 4–6).

41. See Cape Divisional Council (1955, p. 3) for the creation of a "fire path" along the reserve's southern boundary.

42. Cape Divisional Council 1965, p. 1.

43. Cape Divisional Council 1970, p. 1.

44. Cape Divisional Council 1973, pp. 1–2.

45. Cape Divisional Council 1952, pp. 6, 13.

46. For details, see ibid., pp. 13–25.

47. See Middlemiss (1974, p. 76) for the opening of the sanctuary to the public only at the insistence of the Cape Divisional Council.

48. Ibid., pp. 76–79.

49. Ibid.

50. Cape Divisional Council 1972, pp. 32–36; Cape Divisional Council 1975, pp. 4–6; Cape Divisional Council 1976, pp. 3–4; Cape Divisional Council 1977, p. 5.

51. Middlemiss 1974, p. 70.

52. Ibid., p. 414.

53. Ibid., p. 4.

54. Ibid., p. 416.

55. Ibid.

56. Jack Winterbottom retired as director of the Percy Fitzpatrick Institute for Ornithology at the University of Cape Town in 1971 and died in 1984; Gerry Broekhuysen retired from the University of Cape Town in 1973 and died two years later.

57. Draper 1998.

58. Duffy 2000.

59. Transcript of interview with C. H. Langley, Clovelly, January 24, 2014, p. 12.

60. Ibid.

61. Ibid. See also Middlemiss (1974, pp. 76–85, 416–419).

62. Cape Divisional Council 1980, p. 2.

63. Ibid., p. 3. Langley listed remoteness from main tourist route, high crime rate in the area, the lack of public transport, signage, facilities, publicity, and public interest in birdlife, and the "elusive nature" of the birds themselves as contributing factors. See Transcript of interview with C. H. Langley.

64. Cape Divisional Council 1980, p. 3.

65. Cape Divisional Council 1982, p. 3.

66. Cape Divisional Council 1981, p. 2.

67. Cape Divisional Council 1984, p. 3.

68. Cape Divisional Council 1976, p. 4. See also Cape Divisional Council (1987, pp. 5–6).

69. Cape Divisional Council 1985, p. 5.

70. Cape Divisional Council 1986, p. 2.

71. Transcript of interview with C. H. Langley, p. 14.

72. Ibid., p. 15.

73. Cape Divisional Council 1983, pp. 2–3.

74. Cape Divisional Council 1986, p. 5; Cape Divisional Council 1987, p. 10; Cape Divisional Council 1988, p. 5.

75. Cape Divisional Council 1976, p. 6.

76. Cape Divisional Council 1977, pp. 11–12.

77. Cape Divisional Council 1975, pp. 6–7; Cape Divisional Council 1976, p. 7.

78. Cape Divisional Council 1975, p. 7; 1976, p. 7. The idea was first mooted by R. G. Atwell in 1964.

79. Cape Divisional Council 1976, p. 7.

80. Cape Divisional Council 1981, p. 9.

81. Cape Divisional Council 1983, p. 6; Cape Divisional Council 1984, p. 9.

82. Cape Divisional Council 1982, p. 8; Cape Divisional Council 1984, p. 9.

83. Cape Divisional Council 1984, p. 9; Cape Divisional Council 1985, pp. 2, 11; Cape Divisional Council 1988, pp. 11–12.

84. See Cape Divisional Council (1952, p. 17) for Middlemiss's report that he had "been given to understand that the [sedge] beds have been burned regularly in the past by local inhabitants" and Middlemiss (1974, pp. 29–31, 87–88) for his defense of his exclusion of fire from the sanctuary.

85. Cape Divisional Council 1978, p. 6. See also Cape Divisional Council (1979, p. 6); Cape Divisional Council (1980, pp. 14–15); Cape Divisional Council (1986, p. 9) for the retention of acacia along the northern and eastern fence lines as "buffers" against the surrounding black township and the removal of these "buffers" in 1980 and the late 1980s.

86. Cape Divisional Council 1981, pp. 10–11.

87. Cape Divisional Council 1978, pp. 12–15; Cape Divisional Council 1979, pp. 13–14; Cape Divisional Council 1980, p. 20.

88. Cape Divisional Council 1981, pp. 13–14.

89. Cape Divisional Council 1985, p. 2.

90. Ibid.

91. Ibid., pp. 2–3; Cape Divisional Council 1986, pp. 2–3.

92. See, for example, Petersen et al. (2012) for the post-apartheid proletarian pressure on the city's reserves, and Graham and Ernstson (2012), Ernstson (2013), and Ernstson and Sörlin (2013) for some community-based conservation responses in Cape Town.

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romantic and sexual practices that would otherwise have been stifled; it allows youth to express themselves as lovers, desiring and desired subjects who can more fully participate in the increasingly influential discourse of romantic love and courtship.

The domestication of the Ridge thus not only created new bourgeois forms of recreation and caring for the self, but also enabled romantic and sexual practices in public spaces, pushing against the limits of what is considered culturally tolerable and gradually widening them. Making the Ridge safer for ordinary and elite citizens had another unintended effect. Some of those who came to the park for morning walks were drawn to the area that was still wilderness. Sanjeev Khanna remembers when his dog darted into the undergrowth, chasing a Grey Partridge or some exciting scent.[33] *“When I followed him, pushing through the bushes, I found myself alone. There was nothing but the sound of birds. It was cooler and the air was sweet and clear. It was gorgeous. Really wild. Other people wouldn’t go into this part of the Ridge, but I loved it.” Khanna was a teenager in the late 1970s, when he literally stumbled into a fascination with the wilderness of the Ridge. Later, he met a few other school and college students who were interested in bird-watching and began to go on nature rambles with them, learning about the flora and fauna of the Ridge and how it had changed over the last one hundred years and coming to understand the ecological importance of the forest. In 1979, on reading that a section of the Central Ridge had been demarcated for constructing schools, the students decided to organize a protest rally in which they were joined by the residents of Rajendra Nagar, the neighborhood next to the proposed clearance. A year later, the students went on to form Kalpavriksh, an “environmental action group” that campaigned against the diversion of the forest to other land use and the conversion of wilderness into parks.*[34]

Over the next two decades, Kalpavriksh continued to monitor the Ridge’s biodiversity by conducting annual bird counts and mapping the vegetation. Hoping to ignite the same spark of understanding and appreciation of the wilderness in others, members guided school and college students on “nature walks.”[35] *It published a booklet about the Ridge and its threatened status.*[36] *It petitioned the lieutenant-governor of Delhi and other officials to prevent the destruction of the Ridge. Even as Kalpavriksh went on to study and campaign about a range of emerging conflicts between ecology and economic development, traveling farther afield into rural India,*

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11 Ecology in the Urban Century: Power, Place, and the Abstraction of Nature

James Evans

Humans are now an urbanized species, with over half of the global population living in cities—a proportion forecast by the United Nations to rise to 75 percent by 2050. At the same time, the Intergovernmental Panel on Climate Change has claimed with 95 percent certainty that climate change is being driven by human activities, prompting scientists to herald the advent of the Anthropocene, a new era in which humans have become the main drivers of environmental change. The challenge of securing a sustainable global future has become a question of taming the environmental impacts of cities. Within this context, ecology has emerged as a technology of governance, promising a way to manage human relations with nature in more sustainable ways. As in the nineteenth century, when crusading sanitarians and engineers tamed death and disease with modern infrastructures supplying water and energy, so in the current urban century, urban ecology is being heralded as being capable of arresting environmental destruction with closed loop systems and adaptive management. Ecology is the scientific assumption lying behind every rhetorical “eco” preface, providing a compass to navigate safe passage to the promised land of sustainability.

The irony of this redemptive role is that ecology originated as a discipline not primarily concerned with people. Environmental historians have offered compelling accounts of how concepts like *succession* and *ecosystems* embody the specific characteristics of the rural and wilderness areas in which early ecologists worked. Sometimes the parallels are literal: the idea of “pioneer” plant communities was derived from research conducted on the vast plains of the Midwest in early twentieth-century America, across which human pioneers had moved barely a century earlier. One particularly stubborn consequence of this has been the hardwiring of cultural preferences for “wild” environments into the scientific models of ecology itself, which tend to value equilibrium systems.[2] When we come to human-dominated systems this has made life difficult. Urbanization results in extremely disturbed systems, where the creative destruction wrought by capitalism in the form of constant development and redevelopment creates an inherently dynamic landscape. In ecological terms cities make little sense, they fit none of the models, and tend to be cast (traditionally at least) as a form of "anti-life."[3]

Until the 1990s the ecological study of cities was largely confined to a handful of German ecologists trapped on the urban island of West Berlin and to the coffee table publications of a few curious naturalists. The Rio Earth Conference in 1992 changed this dramatically, prompting ecologists to call for a "new ecological paradigm" that places humans within ecosystems rather than separate from them.[4] In this era of urbanization,[5] applying systems ecology to cities to develop technologies of ecological governance holds great appeal as it suggests that they are coherent, knowable, and manageable entities.[6] The prize of managing urban ecosystems more sustainably is substantial: cities consume 70 percent of natural resources and produce 80 percent or carbon emissions. They are home to a growing majority of the world's inhabitants and must increasingly adapt to the consequences of a changing climate. No longer simply a curiosity, urban ecology is supposed to facilitate low carbon transitions and help city dwellers adapt to rising temperatures and increasingly extreme weather events. As if that weren't enough, its proponents highlight significant physical and mental health benefits and property price uplift that accrue from proximity to nature.

Urban ecology has gone from subdisciplinary backwater to hot topic, viewed as a key disciplinary ingredient in the quest for sustainability. But perhaps more than any other science, ecology reflects the places in which it is practiced. This chapter explores how urban ecology dovetails with the rise of ecological governance and the suite of ecological planning and policy tools like ecosystem services, green infrastructure, and resilience that accompany it. These highly mobile global policy discourses increasingly frame debates over urban futures, but are characterized by a series of tensions that hamper their application. This chapter critically examines these tools and the forms of urban ecological research through which they are practised and produced. It identifies a gap between the discursive power of urban ecological governance and the relatively modest transformations wrought in cities on the ground and discusses some of the implications of this gap.

The Rise of Ecological Governance

In 2006 the United Kingdom's Department for Environment, Food and Rural Affairs held a meeting in central London to review its research program to establish an evidence base for the adoption of ecosystem services as the foundation for national policymaking.[7] The ecosystem services approach is typical of an increasingly influential set of ecological policy tools that have emerged in response to ecological crisis. The meeting was memorable not for the bad coffee or for the sterile conference room that seemed at odds with the magnificent Georgian building in which it was housed, but for an exchange between a well-known professor and the senior government official who up until that point had sat in pinstriped silence observing proceedings, content to let his minions remind the academic audience of the desired outcomes from the work. The professor stood up and proclaimed that the ecosystem services approach was unable to provide the kind of comprehensive basis for decision-making that was sought because of the difficulties in determining the subjective values of different environmental goods to different people in different places. His outburst was preceded by a circular discussion about the policy implications of valuing a single plane tree in London at one million pounds on the basis of its positive impact on house prices, as against a Scottish pine forest that is rarely used by humans and is by comparison relatively worthless.[8] Riled into action, the senior government official retorted that the department had already decided to use the ecosystem service approach as the basis for its policymaking. It was their job to "make it work"; that was what they were being paid for.

The episode sticks in the mind as an example of the all-too obvious ways in which power sometimes shapes the types of knowledge that gain wider political traction, in this case through the demand from policymakers for ecologically informed tools to better govern society's relations with nature. But the "just make it work" line belies a disjuncture between the promise of ecosystem services as a policy approach and its realities as a scientific planning tool. Alongside ecosystem services, green infrastructure and resilience have emerged in the last fifteen years as a familiar conceptual lexicon for those working in urban environmental planning. All three offer an idealized and universally applicable form of ecological governance, but are based on highly abstract and stylized models of nature (and the relation of society to it).

Take green infrastructure, for example. Originating as a conservation tool for understanding how habitat patches maintain biodiversity in landscapes fragmented by human land uses (like roads, housing, and so on), it has developed into a fully fledged planning concept that is used to capture the multiple functions of green space, for example absorbing rainfall while also providing recreational space. The idea of infrastructure offers a proactive discourse of green space as "doing something" useful for society, but further it suggests a narrative of necessity.[9] Infrastructure is something that we have to have and fits neatly with established approaches to planning, which are familiar with surveying, analyzing, and planning so-called "grey" infrastructures like roads and sewers. In *The Wealth of Nations* Adam Smith assigns the task of constructing and maintaining infrastructure to "the sovereign," who is responsible for "erecting and maintaining certain public works and certain public institutions, which it can never be the interest of any individual or small number of individuals to erect and maintain."[10] Infrastructure is a collective good and as such implies the need for a collective approach.

The ecosystem service approach is often used to value the services provided by various pieces of green infrastructure, although the two approaches differ critically between advocating individual payment for services and simply using the value of services to justify collective investment in the service provider. Lele's memorable analogy is the difference between paying for a hot dog and investing in a hot dog stand, with the inference that it makes little sense to talk of "investing" in a hot dog.[11] Green infrastructure has been conceived of as a form of ecological modernization that promises a win-win approach to planning whereby environmental improvements lead to social and economic benefits. As Maarten Hajer says, "talking about nature as infrastructure creates a link to the importance of nature as amenity (which is essentially a functional idea), but also allows for an engineering approach to nature. If nature is seen as infrastructure, we can also make a move from conservation to the actual creation of new (and better?) nature."[12] Green infrastructure has become firmly entrenched in actual planning practice. Whereas ecosystem services have been pushed to high level policymakers through international consultants and the UN-backed Millennium Ecosystem Assessment, green infrastructure resonates at local and regional levels and propagates through nongovernmental organizations' (NGO) planning networks.[13] The paucity of critical work on green infrastructure perhaps reflects its politically benign exterior, but the idea of nature as essentially malleable and improvable points to an underlying set of beliefs about the relations between society and the environment that warrants further attention in practice.[14]

By contrast, resilience thinking is more explicitly concerned with the relationships between society and the environment. Originating in the work of North American ecologist "Buzz" Holling, *resilience* is defined as the capacity of a system to absorb disturbance and reorganize while undergoing change so as to retain essentially the same function, structure, identity, and feedbacks.[15] Using the example of budworm outbreaks in the spruce-fir forests of eastern Canada, Holling argued that persistent natural systems are not characterized by stability but by instability.[16] Holling's work influenced the 1999 establishment of the Resilience Alliance, an international collaboration among ecologists and ecosystem management scholars from across the Western world. This group developed the concept of the social-ecological system,[17] which applied resilience thinking to human-dominated systems. Developed in the 1990s and elaborated in two edited volumes with contributors from all over the world,[18] this approach suggested that social and ecological systems are linked through a series of physical feedback mechanisms. Knowledge about the local ecosystem is essential to the functioning of a social-ecological system and must be captured by institutions that can translate it into management practices. The idea of social-ecological systems was subsequently applied to urban contexts,[19] and it became an organizing concept for the Stockholm Resilience Centre, established in 2007.

The lexicon of urban environmental planning is astonishingly consistent. It is hard to find a conservation planning document for an urbanized region that does not use green infrastructure as its basis, justifying its value through general appeals to the ecosystem services that it provides society.[20] Resilience has found its way into numerous policy documents and often appears as a guiding principle.[21] In policy documents about regional resilience again ecosystem services are usually suggested as a way to quantify the value of different socio-ecological processes.[22] Currently these approaches tend to remain confined to conservation strategies and regional planning documents, rather than being deployed as the basis for mainstream decision-making (which remains dominated by economists). In practice the rhetoric is defeated by the difficulties of governing something as complex as a city as an ecosystem; for example, there is simply insufficient environmental data to do so, and traditional institutional arrangements militate against large-scale landscape interventions. Even a coherent conceptual understanding is lacking—the striking observation from a cursory analysis of the policy and academic literature is that research teams tend to work with one approach.[23] An analysis of keywords listed in paper titles and abstracts in the fields of ecosystem services, green infrastructure, and urban resilience indicates that 13 percent of green infrastructure papers and 21 percent of resilience papers mention ecosystem services, whereas only 10 percent of ecosystem service papers mention resilience. This drops to just 2 percent of ecosystem service papers mentioning green infrastructure. The relationship between resilience and green infrastructure is weakest, with 2 percent of resilience papers focusing on green infrastructure and 4 percent of green infrastructure papers focusing on resilience.[24]

Despite this unevenness, ecological governance holds strong appeal for policymakers looking for a more scientific basis for urban environmental management. The next section considers a large-scale field experiment underway in Baltimore, which is notable for bringing these three ecological approaches together to study the city as a coherent system. It is perhaps unique in being the place where the model of ecologically based governance is being deployed and tested most seriously, and offers a window onto both the potential and the limits of urban ecology to reshape cities.

Baltimore: Ecological Laboratory for the Urban Century

Funded by the United States National Science Foundation from 1980 up to the current day, the Long Term Ecological Research (LTER) program represents the flagship environmental science research programme in the United States, comprising twenty-four ecologically diverse sites, an annual direct budget of almost $20 million, and approximately 1,100 scientists and research students. Two metropolises (Phoenix and Baltimore) were added to their portfolio of sites in 1997, and both projects were granted second-phase funding in 2004. Led by influential urban ecologists Nancy Grimm at Arizona State University and Steward Pickett at Baltimore, respectively, both research teams adopted a large-scale ecosystems approach, both sold themselves on the potential to use their cities as field laboratories, and both emphasized the virtues of a comparative approach between cities. The project married shifting scientific funding priorities for large-scale applied work capable of producing scalable findings with the needs of two cities (Baltimore and Phoenix) under pressure to deal with growing environmental externalities in more efficient ways. This section focuses on the Baltimore research, which has established the city as a laboratory for the staging of large scale socio-ecological experiments that aim to understand and manage the dynamic processes that give rise to the urban landscape.

Ecologists in Baltimore have been seeking to understand how the city's ecosystems change over time by studying the interaction of a range of factors, from hydrology and biodiversity to patch dynamics and soil studies. The Baltimore project states that "its goal is to develop a thoroughgoing understanding of metropolitan Baltimore as an ecological system, and to share this understanding with educators and decision makers."[25] Baltimore represents the cutting edge of ecological work that seeks to move from seeing human activity purely as an external factor causing disturbance to ecosystems to being a driver and limiter of ecological processes in its own right. The overall project is framed by the concept of resilience, conceiving Baltimore as a linked socio-ecological system. Taking an adaptive approach, the project involves staging experiments by altering the green infrastructure in parts of the city to enhance key ecosystem services.

At the core of the work, in addition to the $20 million annual budget, is a nearly $1 billion, six-year experimental manipulation of nitrogen exports in the watershed to improve drainage infrastructure. Like many cities with a primarily industrial heritage, Baltimore is characterized by aging infrastructure and a decrepit sanitary sewer system, much of which is over one hundred years old. Leaks and gradual seepage, accompanied by the occasional yet spectacular sewage fountain, have caused declining water quality, and in 2002 eventually led to a legal action from the US Environmental Protection Agency under the Clean Water Act. In addition to paying $600,000 in fines stipulated in the resulting agreement, city officials had to agree to invest $900 million in sewer upgrades. The wider Baltimore County settled on a similar agreement in reparation for over six hundred spills between 1997 and 2005, providing further money for environment projects to keep nitrogen and phosphorus out of the Chesapeake Bay. These federal mandates opened up opportunities for ecologists to work closely with urban planners and administrators to undertake experimental planting to manage runoff using green infrastructure.

The most intense experiments took place in Watershed 263, a 930-acre area spread over eleven densely populated neighborhoods of west and southwest Baltimore, which drains to Baltimore Harbor's tidal estuary of the Middle Branch of the Patapsco River, near the mouth of Gwynns Falls. Over three quarters of the area of this entirely urbanized watershed, with its mix of residential, commercial, industrial, institutional, and open-space uses as well as roads, parking lots, and vacant or abandoned properties, is impervious to water. In terms of infrastructure, it includes thirteen miles of storm drains that are over three feet in diameter and that converge into one twenty-five-foot diameter outfall. Public open space associated with schools and parks accounts for approximately 30 percent of the watershed, with trees shading only about 5.5 percent of the area compared to 17.32 percent for the city as a whole. The area is economically depressed and predominantly African American, and the Baltimore LTER and its focus on technologically mediated management have echoes of World Bank–style development initiatives, lending a normative liberal politics to the selection of the Gwynn Falls area as one in need of improvement.

Terming it a "natural experiment," the research team undertook extensive greening to increase canopy cover and decrease impervious surfaces especially on vacant and public land. The project team hardwired monitoring equipment into the green infrastructure to provide a basis for adaptive management, aiming to enhance the reduction of pollution through intervening in specific areas and adapting subsequent policy and regulation in response to the results of infrastructure improvements. If experimenting in situ produces more accurate scientific models,[26] then the idea was that "urban ecologists could use designed experiments as a management tool to predict, monitor, and regulate urban ecological patterns and processes."[27] These interventions are monitored in terms of their effects on pollution and runoff, while long-term species surveys of different plots across the city determine the relationship between patch origin, size, adjacent land-use type, and species composition and abundance.

This long-running ecological research project has led attempts to understand the city as an urban socio-ecological system in order to enhance its resilience, building upon the work of the US Long Term Ecological Research network of which the project is part.[28] Accordingly the project is also researching what it calls "social ecology," or the capacity of people to either damage or enhance the ecological functioning of the urban landscape. Although the concept of the social-ecological system emerged from work conducted at the Stockholm Resilience Centre,[29] it has been used by the

Baltimore project team to understand how the urban mosaic functions at the scale of the city. This point is picked up in Pickett and colleagues' review of urban ecological systems,[30] which argues that urban ecological planning tends to be based on principles and cases rather than data and an understanding of processes. The problem identified is that the former approaches struggle to manage the kinds of "novel ecological circumstances" that cities will experience under a rapidly changing climate. This argument is reminiscent of debates from the first half of the twentieth century over the ability of ecology to generate scientifically valid knowledge about causal processes, given its field-based methods and emphasis on the identification of patterns.[31]

The Baltimore project uses computer modeling to understand how different variables affect one another in the city, and seeks to abstract from the specificities of Baltimore through the idea of *syndromes*, or commonly occurring sets of urban environmental characteristics that have predictable functions. The inference is that cities will then be susceptible to standardized management interventions. In capturing general sets of traits rather than a specific set of rules about function, the notion of syndromes owes more than a passing resemblance to Elinor Ostrom's diagnostic approach to Common Pool Resource Management (perhaps no coincidence as Ostrom worked with resilience scholars in her later career).[32] Within this conceptual framework the diagnosis of "symptoms" enables corrective management. The danger of viewing cities as sick patients, though, is that it reproduces the idea that urban nature is a degraded form of "real" nature, echoing the pathologies of the city—like crime and pollution—identified by the writers of sociological urban ecology in the 1970s. Of course that movement lacked any real empirical or explanatory basis, unlike the large-scale and long-term urban ecology research programs occurring in places like Baltimore, which collect large amounts of data to enable a process-based approach.

As an experimental site Baltimore has become emblematic of a specific brand of urban ecology that seeks to meet the demand for data-driven technologies of conservation to underpin sustainable urban management. That said, how generalizable the findings about urban resilience from Baltimore are remains an "open question for now."[33] Baltimore's modern history of deindustrialisation seems quite extreme, compared for example to Stockholm or an East Asian city. At a deeper level, the kind of complex adaptive systems that inform resilience thinking purports to be general and universal, and yet enrolls researchers into the specific systems that they study. In Baltimore the city is transformed from the object into the subject of research; it is a system or laboratory that is simultaneously altered by research as it is conducted.[34] Within this context there is no distance between scientific work and its practical application—a situation that empowers ecologists, Geographical Information System scientists, and environmental scientists not only to engage with but also to stand in for urban planners and policymakers who are traditionally responsible for managing the city. Seen in this light, ecological research is both an applied mission to transform nature in place and an attempt to discern and abstract a set of universally replicable rules and knowledge for use elsewhere. The next section considers these dynamics.

Place, Power, and the Abstraction of Nature

In Baltimore's Watershed 263 ecologists have directly shaped urban nature, building the indicators, designating the sites, defining what counts as desirable nature, and most importantly, installing it in the urban landscape. Ecology intervenes as a form of delegated power provided by the avoidance (or impossibility) of positive action from traditional urban actors. But while the Gwynn Falls study demonstrates the power of ecological perspectives to shape the urban landscape, it simultaneously highlights the inability of ecological science and policy tools to address the pressing social and spatial rifts that characterize contemporary cities. What does monitoring of nutrient loading and urban resilience have to say about massive unemployment? It would be difficult to imagine a scenario in which someone watches David Simon's television series *The Wire*, set amid the poverty and corruption of West Baltimore, and concludes: "You know what Baltimore could really use? A multimillion-dollar investment in monitoring, research and experimentation with nutrient loading in its urban streams and wastewater system."[35] In this way, such research shares much with other technocratic urban governing techniques, ranging from sustainable development projects to so-called Smart Cities, which are disconnected from everyday life and the wider political and economic structures that shape it.

This disconnect matters on the ground as ecological tools empower some actors and disempower others.[36] Green infrastructure has been promoted by and is enacted largely by landscape architects, planners, and conservationists through a managerial approach. Putting ecosystem services into practice requires different skill sets, ones that empower economists, social scientists, and psychologists to discern financial values from quantitative and qualitative datasets and favoring policymakers and planners with the ability to understand and interpret these kinds of knowledge. Resilience and socio-ecological systems privilege the ecologist, albeit one who can link socio-ecological flows to financial and economic imperatives.[37] Within the technocracy of ecological governance each policy tool empowers subtly distinct groups of actors and types of knowledge. Just as the emergence of the sanitarian city in the nineteenth century required a new cadre of urban planners, engineers, and public health experts, so the shift from the sanitarian to the sustainable city involves a renegotiation of professional roles. The danger of this is that it displaces local voices and actors from the arena of urban transformation.

The adoption of conceptual frames like resilience reflects a desire to lend extra scientific credibility to urban governance, but gives rise to an exertion of power without any formal power being attributed. As any practising urban ecologist will attest, ecologists and their interventions play only a very modest role in directly transforming the cities in which they work. The greater effects of their work are to reproduce global discourses of urban ecological governance and the promise of systematic and generalizable knowledge through scientific knowledge production. Ecologists must first *extract* knowledge from cities through intensive, long-term field studies, if they are to subsequently *abstract* it as a generalized body of urban ecological knowledge to sustain the universal approaches of ecological governance. It is precisely the impossibility of ever collecting perfectly representative data and the prohibitive costs of collecting comprehensive data for every city that necessitate the abstraction of general principles for urban governance. Baltimore is the place in which ecologists are trying to explain the trademark functions of urban ecology, translating field studies into generalizable principles of the kind that can underpin the scientific management of the sustainable city.

The inherent tension between ecology as a field science reliant upon particular places and its urge to establish principles explains the slippage when specific approaches are rolled out as general fixes. For example, Stephanie Pincetl's critique of the million-tree initiative to plant large numbers of trees in several major US cities suggests that the ecological services provided by different species in different places vary hugely and are poorly understood. A type of tree that sequesters carbon in the midwestern climate of Chicago may do nothing in Los Angeles.[38] The assumed ecological benefits from widely regarded "good policies," like simply planting lots of trees, are largely a matter of faith. Resilience represents a discursive ecological policy tool, which frames systemic approaches within a model of how society functions. As an umbrella goal for cities and regions it is hard to argue with, but what it means on the ground as a governance tool at the local level is less clear. Its success in penetrating national and international policy networks stands in contrast to the difficulties of implementing it as a meaningful basis for decision-making in local and regional contexts.[39]

Of course the tendency of environmental discourse to trade in global claims, which assume singular conceptions of citizenship and place, is not new. Talking about the emergence of global climate science in the 1990s, Jasanoff and Wynne argue that its establishment involved "not only the international coordination of assessment and policies but also the difficult task of harmonization at the cognitive level."[40] By "cognitive harmonization" they mean the processes by which ways of defining, conceptualizing, and measuring objects of research achieve general acceptance among scientists, funders, and policymakers. Environmentalism has evolved through a series of acceptances that goes something like this: global environment = global environmental problems = global environmental solutions, with each stage corresponding roughly to the 1960/1970s, 1980s/1990s, and 2000/2010s, respectively. The Future Earth program provides a recent example. Established in 2012 by the International Council for Science, an NGO based in Paris, this ten-year international research initiative aims to develop the knowledge for responding effectively to the risks and opportunities of global environmental change and to support the shift toward global sustainability. Mimicking the International Panel for Climate Change, its goal is to mobilize thousands of scientists from around the world to establish a coherent platform from which to engage high-level policymakers and other stakeholders "to provide sustainability options and solutions in the wake of Rio+20 [the United Nations Conference on Sustainable Development, 2012]." Global environmental science since the turn of the millennium has created an industry in global solutions, of which Future Earth reflects a recent and extreme version. This cognitive harmonization is now extended to the management of cities as well. The rational and data-centric approach of this brand of urban ecology shares much with the technocentric discourse of Smart Cities, which increasingly holds sway as the solution to urban sustainability challenges, especially in the context of the construction of new cities in the Far East. In the urban century the boundaries between the urban and the environmental solution industries are becoming increasingly blurred.

Pressure from policymakers to simply “make it work” highlights the disjuncture between abstracted global discourse of urban nature and the embedded and messy realities of ecological research underpinning them. This deficit of scientific understanding is of course cast as a solvable problem, discussed in terms reminiscent of the arguments put forward by climate modelers in the 1990s whereby more money to do more research that will collect more data to produce better models will fix the problem. Ecological governance here runs aground on a familiar shore: the inherent specificity of environmental processes in different places at different times. What is interesting, and it formed the starting point for this chapter, is the way in which urban ecological approaches have spread so rapidly, becoming entrenched in mainstream global discourse (and funding priorities) in spite of their inherent difficulties.

Conclusions: (Dis)Placing Ecology

Almost without anyone noticing, urban ecology has become a foundational ingredient of governance in the Anthropocene. Dovetailing neatly with other technocentric approaches like Smart Cities, technologies of ecological governance are increasingly promoted as approaches to urban management. The appetite of policymakers, funding bodies, and planners for ecologically informed decision-making tools has grown in tandem with the emergence of an increasingly influential set of research institutes and NGO networks that promote different approaches around the world. The growing rhetoric of global solutions finds expression in an increasingly complex mixture of approaches on the ground, nourished by a growing reliance on long-term and large-scale scientific research. There is clearly value in understanding the processes and practices of knowledge generation and translation that underpin urban ecological governance. For example, how do ecological governance models originate and circulate through research and consultancy networks? The knowledge produced by ecological research is “placed” in the sense that it is generated through intensive, long-term field experiments, but it must subsequently be displaced through processes of abstraction that allow it to move around the world as a basis for ecologically informed planning. To study such things means being attentive to the actual practices and concepts of ecologists through which “truth” is squeezed out of field sites.[41]

Initiatives like Future Earth and approaches like resilience resonate with the dream of rational management that underpins the Modernist project, but ecology is an inherently field-based science that resists generalizations of the kind required by scientific management. As Holling stated twenty years ago, “Knowledge of the system we deal with is always incomplete. Surprise is inevitable. Not only is the science incomplete, the system itself is a moving target.”[42] Statements like this are almost mystical in their simultaneous recognition and simplification of complexity within an over-arching theory of change, but are typical of what we might call “ecological gurus” who populate an emerging cabal of policy-focused global scientists. What Ernstson and Lewis call the “alchemy of transformation” subsumes geographical difference within a one-size-fits all understanding of how change takes place over time.[43] Here the abstractive urge reduces space to time, subsuming local ecologies under standardized tools and techniques. Politically, abstraction privileges scientific forms of knowledge as the basis for decision-making, thereby insinuating a democratic deficit within current models of urban nature.[44] Practically, the lack of executive power afforded to ecologists means that little changes on the ground anyhow. Returning to the opening anecdote, the problem with “making it work” concerns what is lost in terms of the ability to produce genuinely democratic and local urban transformations. Understanding the abstractive moments and scientific practices through which global claims intersect with local place is necessary to open up the possibility of recognizing and nourishing more multiple and nuanced ecologies. Unfortunately the obsession of national funding bodies and global scientific councils with data, process, and scalability is moving ecology away from heterogeneity rather than toward it. Whether the richness of multiple Earths can be captured by the language of systems, services, and syndromes is the question at hand.

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Notes

1. Worster 1994; Kingsland 2005.

2. Cronon 1995.

3. Sukopp 2003, p. 295.

4. Alberti et al. 2003.

5. Ljungkvist et al. 2010.

6. Ernstson et al. 2010.

7. The term "ecosystem service" refers to the delivery, provision, protection, or maintenance of goods and benefits that humans obtain from ecosystem functions (Millennium Ecosystem Assessment 2003).

8. These debates have generated much discussion and research; for example, see Bolund and Hunhammer (1999); Boyd and Banzhaf (2007); Gómez-Baggethun et al. 2010).

9. Lennon 2014.

10. Smith 1976, quoted in O'Neill 2013, p. 443.

11. Lele et al. 2013.

12. Hajer 2003, p. 106.

13. Lennon 2014.

14. Wright 2011.

15. Walker et al. 2004.

16. Budworm is usually controlled by natural predators but is occasionally responsible for major outbreaks that destroy mature fir trees. Between outbreaks the firs tend to out-compete the spruce and birch, which suffer more from crowding, producing a forest dominated by firs. But given the combination of large numbers of fir trees and a succession of dry years, budworm populations can escape the control of their predators and cause another outbreak. The outbreak ends when the budworm

population destroys so much of the fir population that it undermines its own food source and the budworm population collapses. Periodic fluctuations in the form of budworm outbreaks are essential in maintaining the budworm, its predators, and the diversity of trees in the forest.

17. Berkes and Folke (1998) characterize socio-ecological systems as coherent interacting systems of biophysical and social factors, which can be defined at different spatial, temporal, and organizational scales and which form a “dynamic, complex system with continuous adaptation.” The socio-ecological systems approach suggests that social and ecological systems are linked by multiple feedbacks and display common properties, such as resilience and complexity.

18. Berkes and Folke 1998; Berkes, Colding, and Folke 2003.

19. Elmqvist et al. 2004; Ernstson et al. 2010.

20. Lennon 2014.

21. For example, ICLEI—Local Governments for Sustainability 2009.

22. Ernstson and Sörlin 2013; Lewis and Ernstson 2019.

23. Exceptions tend to be more focused on urban systems rather than scientific ecology per se (Schäffler and Swilling 2013).

24. This analysis was conducted using the Web of Science, including both scientific and social scientific publications between 1970 and 2012.

25. Pickett, Cadenasso, and Grove 2004, p. 3.

26. Cook et al. 2004, p. 467.

27. Felson and Pickett 2005, p. 555.

28. Grimm et al. 2013.

29. There is an important parallel story to be told about how researchers at the Stockholm Resilience Centre have used the city of Stockholm to develop a related conceptual understanding of the city as socio-ecological system (Henrik Ernstson, pers. comm.), as well as about the relationship between these researchers and those working as part of the LTER projects in the United States developed in the 1990s and 2000s (personal commentary Steward Pickett).

30. Pickett et al. 2011, p. 334.

31. Kohler 2002.

32. Ostrom 2007.

33. Pickett et al. 2011, p. 356.

34. Evans and Karvonen 2011.

35. I am indebted to Joshua Lewis for this observation.

36. Ernstson and Sörlin 2013.

37. Nelson 2014.

38. There is a direct analogy with electric vehicles, which are eco-friendly in California due to the high proportion of clean energy supplying the grid, but produce more carbon than conventional vehicles in Chicago due to the reliance on coal for power generation. When it comes to sustainability, place matters.

39. Resilience thinking has spread rapidly within the environmental policy arena because it promises a way to adapt to the kinds of environmental changes and uncertainty that underpin the Anthropocene (Davoudi 2012). But applying scientific theory to explain the social world is not without its problems. By internalizing crisis, resilience mirrors and reproduces more right-leaning political discourses of individuals (or communities or cities for that matter) fending for themselves in the face of crisis (Evans 2011; Turner 2013).

40. Jasanoff and Wynne 1998, p. 47.

41. See Jens Lachmund's (2013) account of the origins of the Berlin School of urban ecology for an excellent treatment of how place shapes science and vice versa.

42. Holling 1993, p. 553.

43. Ernstson and Lewis 2013. Also see Lawhon, Ernstson, and Silver (2013) for a discussion of how ecology might be "re-localized" from and through the global South.

44. Swyngedouw and Ernstson 2018.

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Figure 9.1
The Südgelände. Photo by Jens Lachmund.

form, to the protection of plant and animal species and their biotopes. Around this concern a quite distinct set of practices and discourses assembled, which I call the *biotope protection regime*. It included diverse actors ranging from academic ecologists to amateur naturalists and conservationists, middle-class neighborhood activists, and representatives of the left-alternative counterculture that flourished in West Berlin at this time. Although these actors and their political strategies differed considerably, they all achieved their political self-definition and their goal orientation at least partly through their sustained engagement with the urban spaces that they framed as biotopes. As with organic urbanism, state-centered planning schemes remained a main policy instrument within this regime. Its content and political momentum, however, were largely the result of contestations and negotiations that extended into the domains of scientific practice as well as civic activism.

In the wake of the international consolidation of ecology in the 1960s and 1970s,[27] some researchers had developed formalized ecosystem models to represent the throughput of energy and materials in exemplary cities.[28] West Berlin soon became recognized as one of the main local centers of

12 Refiguring the Rural: Eco-urbanization in Yixing City

Jia-Ching Chen

> The difficulty of balancing land use and ecological security is great. The intensity of land use in Yixing is very high and ecological environmental protection is already extremely urgent. … The optimization of land use structure requires the closure and relocation of Taihu shoreline towns and a considerable number of enterprises and villages, which will transform farmers' traditional cultivation customs. This will be done.
>
> —Yixing Bureau of Land and Resources, *Yixing Land Use Master Plan (2006–2020)*

> Yixing's Qiting subdistrict has a rainbow-shaped bridge called Tangtian Bridge. Next to the bridge is a completely new residential development called Dongjiao Gardens. The people call it "the evicted households' new paradise."
>
> —"Yixing Dongjiao Huayuan's Qiaodong Residents' Committee and Relocated Households' New Paradise"

Perched on upended cinder blocks at the entrance to the Dongjiao Gardens relocation settlement, the Zhao brothers greet me from their usual spot on the edge of the entry drive near the complex perimeter wall. Twenty feet behind the septuagenarians, a teal Kobelco backhoe shovels in an oscillating pirouette, removing the dark earth hillock from beneath itself.[1] Beyond the excavator, the widening shoulders of Qingyuan Boulevard unfold behind crews of migrant workers, a level line for the flattening horizon of state-planned green development. Across Qingyuan, the shovels have filled a paddy with rubble from Tangtian village, and the itinerant workers have pitched green canvas tents there against the weather. Told from this uneasy vantage point, the story of the Zhao brothers' displacement from their natal village and resettlement at Dongjiao decodes the churning landscape of the countryside in Yixing, and across China.[2] Their story, and many like it, reveals processes of social and environmental transformation that are typically elided by the terms of “green development” and “eco-urbanization” under which economic growth in the region has been promoted. As this chapter will show, eco-urbanization in Yixing extends practices of rural dispossession and deepens patterns of urban-rural inequality by refiguring the rural as a necessary object of social and environmental transformation (see figure 12.1). It is my broader argument here that in facing its environmental crises, the Chinese party-state has sought to maintain local-level economic growth and competition while balancing agricultural land loss by constructing rural land as a national scale environmental resource.

One of the most striking features of China’s state-planned green development is how it refigures rural space and rural society as backward and environmentally irrational at local and national scales. I offer the term “refigure” to refer to the party-state’s making “the rural” into a concrete signifier of diverse social-environmental processes, constituting it as an object of governing and a site of transformation.[3] These processes of refiguring—of *re*-counting, molding, modeling, diagraming, personifying, rationalizing—include the multiple dimensions of ideology, planning practice, culture, and landscape change that shape the “norms and forms” of green development.[4] In this chapter, refiguring refers concretely to party-state calculative practices, spatial planning, physical landscape change, and the cultural politics of agrarian transformation. Urban nature is here imbricated with the rural in material and symbolic ways. This is evident in the physical construction of the “eco-city,” as farmland is converted into sites for housing and the industrial production of green technologies, including photovoltaic (PV) solar panels for global markets (see figure 12.2). Yet, it must be said that the rural is not simply subsumed by the urban. Rather, the rural is forcibly divided from rural society—previously understood as people inhered to natal places of production and reproduction—and is refigured as a space of national environmental governance.[5] In this, I argue that this emergent figuration of the rural is the sine qua non of the party-state’s imaginary of national development as a spatially planned and coordinated project at the scale of the entire national territory.

How is it that such a model of green development by dispossession has gained dominance during a time when there is increasing public and party-state concern over rural land dispossession?[6] In order to examine the construction of green development ideology and its forms of environmental

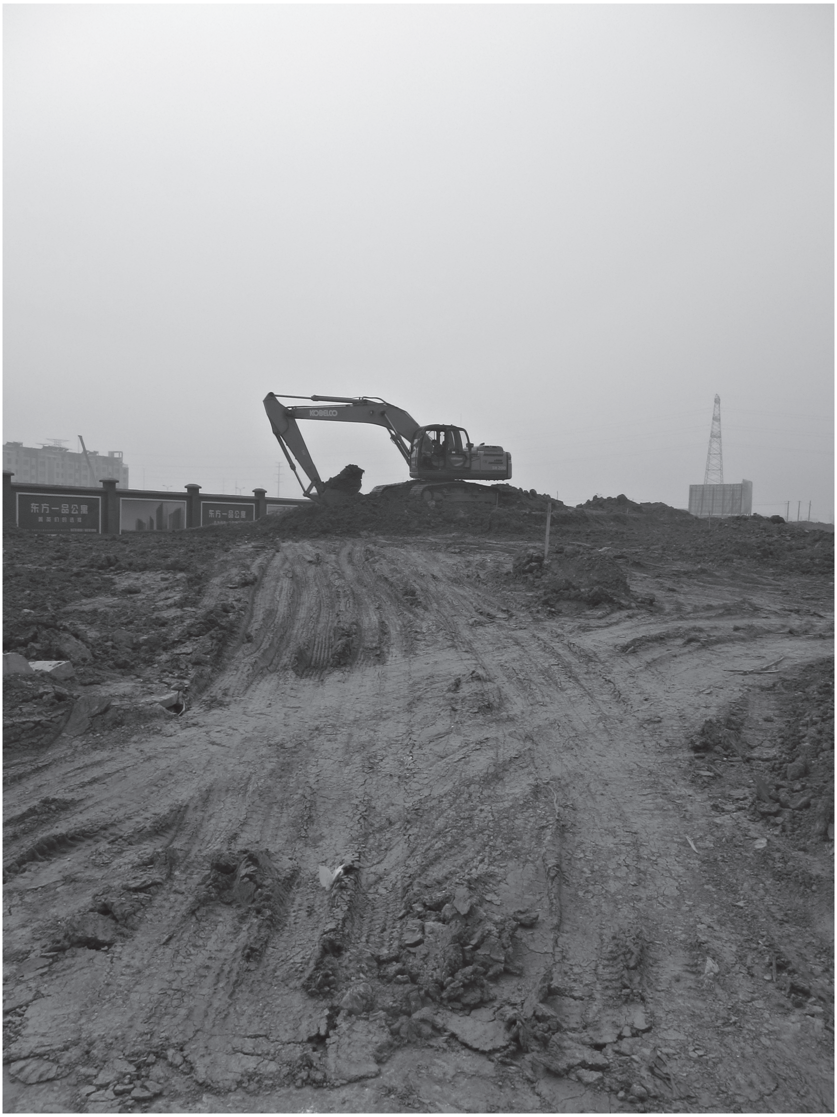

Figure 12.1
The entrance to Dongjiao Gardens, the demolition resettlement housing development for the Zhao brothers and over 15,000 new neighbors occupying 5,380 units. Photo by Jia-Ching Chen, 2011.

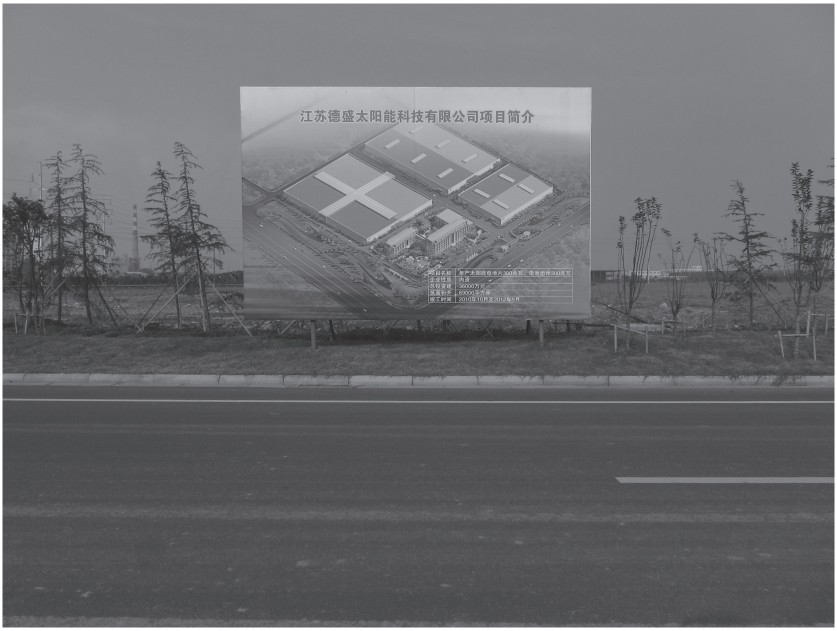

Figure 12.2
The site of the Desheng Solar Technology Company facilities. The Yixing "eco-city" demands the conversion of farmland to sites for the production of green technologies. This billboard shows one of three adjacent solar PV manufacturing projects approved for construction in 2010, occupying 13.5 hectares of village land cleared in 2006–2007, and totaling ¥1.12 billion in investment (US$165.42 million in 2010). Originally slated for completion in 2012, these projects were only partially completed due to the collapse of the global PV market caused largely by a crisis of overproduction, which was itself a result of green development by dispossession in Yixing and other solar special economic zones (SEZs). Photo by Jia-Ching Chen, 2010.

value in China, this chapter focuses on the transformation of rural land and its social relations. With over 330 square kilometers of rural land enclosed since 2006, green development and eco-urbanization in Yixing lie explicitly at the intersection of national land management policies and processes of urban and industrial expansion at the local level. Below, I will discuss this intersection in the implementation of the National Farmland Preservation Policy and the National Land Use Master Plan. These policies constitute the regulatory framework for rural land allocation, which shapes practices of "urban-rural integration" (*chengxiang yitihua*) and ecological resource planning. The chapter analyzes multiple dimensions of green development in Yixing's master-planned urban–rural integration.[7] The following section introduces the case and argues that rural land regulation is at the heart of China's contemporary development. Next, the account turns to the experiences of dispossession and dislocation that green development entails. The subsequent two sections examine the quota allocation mechanisms for governing and rationalizing rural land and document how environmental values are constructed and circulated through the institution of this system. Finally, the chapter provides an analysis of how urban villagers are themselves refigured in the process of eco-urbanization and concludes with a discussion about linking a grounded political ecology of Yixing's transformation and the so-called global green economy.

Refiguring Rural Land for Green Development

Like other cities in the Yangzi delta region, Yixing changed rapidly as urbanization and industrialization accelerated through the Chinese countryside during the 1980s and 1990s. Unlike the rest of its neighbors, however, Yixing has been a site of multiple waves of environmental development policy attention and is a centrally designated "Sustainable Development Experimental Area." In 1993, the State Development Planning Commission created the Yixing Industrial Park for Environmental Science and Technology as the national research and development center for China's Rio Declaration Agenda 21 Program for environmental protection. By 1998, Yixing generated 18 percent of the national total value added in the environmental industry.[8] In 2006, the National Yixing Economic and Technological Development Zone (hereafter, "the Zone") was founded.[9]

The Zone was created to extend these experiences into export industrialization in "greentech" and "cleantech" industries, with special policy attention and incentives given to solar photovoltaics and optoelectronics. These so-called green industry projects form the economic motor for what is conceived of in Yixing's master plan as a larger project of eco-urbanization and rural resource integration—hence, the Zone plan's discursive equivalence of eco-cities as *cities that make green things* and *cities with green environments*.

This vision was prominently supported by Li Yuanchao, then a member of the national Party Central Committee and subsequently the vice president under Xi Jinping (2013–2017). Li proposed Yixing's transformation into a national model "eco-city" (*shengtai chengshi*), extending from the western shore of Taihu Lake across Yixing's chain of lakes. Li's vision of a "water city" provided an aesthetic concept and political support for the *Yixing Eco-City Construction Plan*.[10] In the plan, the concept of the eco-city is defined as a framework for growth through "ecological construction."[11] According to the plan, the Yixing eco-city would provide a model of economic and human development by bridging environmental protection, resource efficiency, air quality, rural village improvements, agricultural modernization, industrial restructuring for cleaner production in key sectors, and landscape beautification. To achieve Yixing's rural transformation via eco-urbanization and the solar industry, the Zone's planning authority was extended to 98.3 square kilometers in late 2006 (see figure 12.3). In order to transform rural landscapes into an "ecological framework" linking Yixing's urban core to Taihu Lake, the Zhao brothers' homes and hundreds of villages were enclosed and subsequently marked for demolition.

In the official discourse of the party-state, such dispossession is justified by idealized relationships between spatial planning, environmental governance, and economic development. This drawing together of multiple dimensions of development into eco-urbanization makes it the model solution to the diverse problems accruing from China's prevalent model of development.[12] At the central government level, the Twelfth Five-Year Plan and the Eighteenth National Congress emphasized the "optimization of national spatial structure as the vehicle for the construction of ecological civilization."[13] The National Development and Reform Commission, the Ministry of Housing, Urban, and Rural Development, the Ministry of Environmental Protection, and the Ministry of Science and Technology have produced complementary policies and standards for establishing model eco-city and sustainable development zone projects. According to the Ministry of Environmental Protection, over 97 percent of prefectural-level cities (284 of 293 total) and 80 percent county-level cities (288 of 363 total) now have state designated eco-city and low-carbon city projects.[14]

Yixing's recent environmentalized land enclosures are certainly not without precedent. Moreover, farmland takings have driven the development of the current land management regime. The Zone's administrative jurisdiction was established by incorporating village lands and township-level industrial parks that had been part of the reform-era wave of rural industrialization that crashed over the Yangtze delta region beginning in

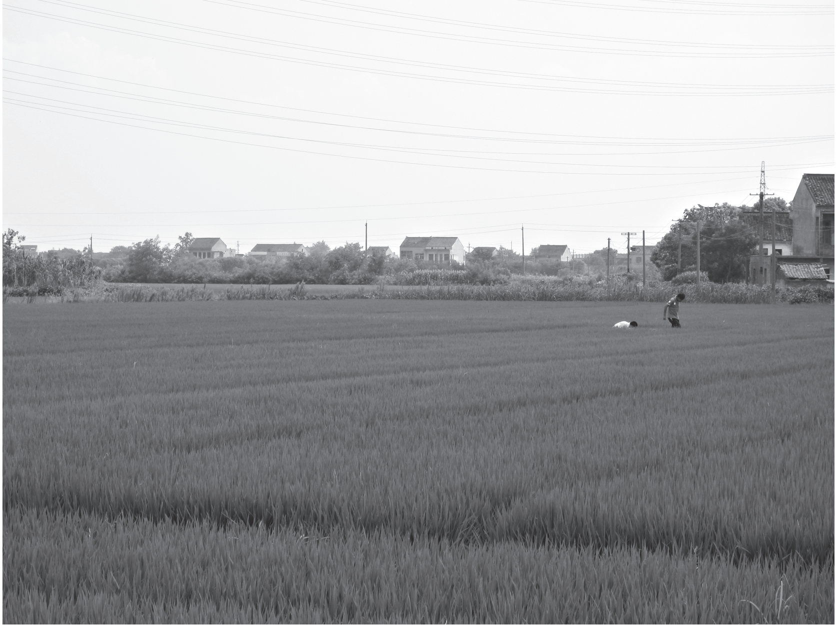

Figure 12.3
These fields of prime farmland and Tangtian village beyond were enclosed into the Zone in 2006. The photo captures the landscape as it was just prior to dispossession and demolition in 2010. Much of this prime farmland was retained in production by contract farmers until it was requisitioned for the later phases of the Dongjiu housing projects, which were completed in 2014. The Zone's eco-city plan, with its integration of nationally supported strategic industries and rural land use optimization, enabled authorities to gain policy exceptions for converting protected prime farmland here and elsewhere in Yixing. Photo by Jia-Ching Chen, 2010.

1978.[15] Without effective regulation of farmland loss, China was faced with the problem of maintaining urban economic growth while simultaneously preserving farmland as a pillar of social stability and food security. In order to address this dilemma, the central government adopted a multipronged farmland preservation and land management regime beginning in 1998 with the promulgation of the amended Land Administration Law. As an explicit effort to address the social, economic, and environmental contradictions of the prevailing model of development, the objective is now to rationalize land use at a national scale and to promote the integration of modernized agriculture with new city building. Under the present regime, land is conceived as a resource to be managed according to two regulatory axes. First, its use and purpose must abide by a nationwide quantification and rationalization of "total land supply" for development (*gongdi zongliang*). Second, rural land is seen as an explicitly environmental resource to be protected and efficiently used.[16]

In the present conjuncture of planned rural transformation and eco-urbanization, the category of farmland (*gengdi*) is critical to both of these regulatory axes. Although the state's environmental valuation of rural land includes place-specific uses such as wildlife habitat and ecological preservation, such "ecological services" are also conceived as attributes that can *and should* be planned under centralized authority. It is this state designation of rural land as fundamentally an environmental resource that produces tensions between ecological preservation, the historical emphasis on maximizing grain production, and the current dominance of land development as a source of local government revenue.[17] This makes rural land a sociospatial Möbius strip: both inside and outside, the figure and the ground, it is topologically a single-boundary object with multiple contradictory dimensions. The making of rural land resources into a calculable economic and environmental object allows it to be mutually intelligible between historically rival logics of socialist productivism and ecological protection, while simultaneously maintaining divergent meanings within each.[18] The intensity of the contradictions contained within it is evidenced by the political justification given to dispossession as necessary for environmental governance and for urban-industrial modernization.

The land regulation regime has been critiqued as riddled with opportunities for arbitrage and institutional failures that are due directly to the dual system of state and collective land ownership.[19] However, this prevalent interpretation implies a one-dimensional hierarchical relationship with the central state, which is "gamed" or "negotiated" by local authorities. In my analysis, the central policy development of "ecological targets" and their implementation at the local level are productive of social-environmental relations in refigured "rural" and "urban" spaces.[20] I argue that the local implementation of such policies through a quota allocation system works to make abstracted quantities—and not the enumerated things themselves—the substantive objects of central governance. Paradoxically, in order to preserve its environmentalized value, rural land in any particular locale is governed as a fungible quantity, divided from its place-specific ecological attributes and "preserved" as an arithmetic constituent of a net sum. Conceptualized by the party-state as an exchangeable resource, rural land can be instilled with different functionalist attributes that are themselves equally divisible and locatable as objects. Thus, environmental resources and services (such as those associated with a wetland) are themselves not taken as intrinsic to any particular locale, but as discrete forms of designated, designed, and built environments.[21] In short, rural land is stripped of its previous social-environmental relations, and fundamental categories of rural sociality—farmers, agrarian production, and villages—are refigured in the process. The following section describes villagers' experience of this process of refiguring the rural—of dividing people, as a biopolitical problem of population, from the land as an environmental problem of resource governance.

Refiguring Villagers through Dispossession

In 2008, the Zhaos were evicted from their natal Fenzhuang village, three kilometers to the northeast of Dongjiao Gardens. Until that time, they had lived through five decades of rural production regimes from collectivization to the Household Responsibility System on through to the present privatized leasehold system. In the previous twenty years, the bachelors had depended largely on subsistence agriculture and occasional daywork for their livelihoods. Since eviction, they also received supplementary income from contract farming lease payments on the remaining village farmland and small payments from the expanded rural pension system since 2009. For two years after their eviction from Fenzhuang, they rented temporary housing in a village just beyond the maw of Qingyuan's eastward extension to Taihu Lake. At the time I first interviewed them, in April 2011, they had been resettled in Dongjiao Gardens for about eight months. Despite the official narrative of the "Dongjiao paradise" described in this chapter's epigraph, the Zhaos and their neighbors experienced years of uncertainty and insecurity as a result of their displacement. "We still aren't used to this place," the elder Zhao Ge commented. "What is there to be accustomed to? This place will never be complete." Raising his chin to the backhoe, Zhao Di finished his statement with an "ahh" that mixed a tone of resignation with a hint of the interrogative. They explained this experience of dislocation in two ways.

First, their resettlement had been fraught with delays, broken promises, and financial difficulties. Although regulations stipulate that resettlement housing for people displaced as a result of land expropriation should be completed before eviction occurs, this has yet to happen in Yixing's eco-urbanization. Rather, the dispossessed receive a cash payment for "transition expenses" (*guodu fei*) such as moving and rent costs. Like most in Yixing, the Zhaos' lump sum payouts were calculated on an eighteen-month transition period and payment for an additional six months of delay were not settled until they moved into Dongjiao. Moreover, the ¥450 (US$65) per month that the Zhaos received would not cover a typical one-hundred-square-meter rental in the area, which averaged ¥500 (US$72) per month by 2009 and ¥650 (US$94) by the end of 2010.[22] Once they received ownership of their apartments, there were further costs as the units were delivered as bare concrete boxes with no finishes. These shortfalls and increased living costs for electricity, cooking fuel, water, and food meant that during the entire period of "transition," the Zhaos had to spend their savings and take up piecework "greening" the roadside landscaping in the Zone for ¥50 (US$7.2) per day.[23] The point here is not merely to convey that the Zhaos and their fellow evictees met hardships and exploitive conditions. Rather, the objective is to show how these conditions are features of Yixing's model eco-urbanization. For many villagers, the compensation scheme has served to enclose and circulate their cash savings, originally intended for retirement and emergencies, as a form of land and real estate development finance.

This leads to the second aspect of the Zhaos' experience of "incompleteness": the literal unmaking of their social-environmental world in the transformation of the rural landscape. Zhao Di's remarks referred not only to the under-constructed environs of Dongjiao Gardens, but to the larger eco-city project and the encompassing special economic zone. While they had been evicted over two years prior, their land had yet to be requisitioned for development. In fact, the Zhaos and their neighbors frequently returned to their former village. Bicycling for an hour, they went back to the site of Fenzhuang once or twice a week to tend the vegetable gardens they still depended on for subsistence. In the evening, they would bring a small harvest back, intended to last the days until they returned. The brothers complained that their vegetables were not as they had been before their eviction. "They don't taste good, they're yellow and they rot quickly." They partially attributed this degradation of their food to intermittent care, but emphasized changes to the soil and water resulting from the demolition of the village and ongoing construction projects. Regardless, the imminent “completion” of post-dispossession transition will leave no access to farmland, and the Zhaos and other ex-villagers still dependent on subsistence activities will almost inevitably be left in a much worse position. In my surveys, evictees without access to gardens or cropland reported that weekly food expenses increased by over ¥70 (US$10) per person.

Different resettlement processes and temporary housing situations led to very uneven access to village plots. Furthermore, the quality of plots after village demolition also varied widely. For example, I met other former residents of Fenzhuang who did not experience crop damage. Others reported that the demolition workers were stealing their vegetables. For their part, workers told me that they only took food from gardens that they tended themselves in plots that they observed were abandoned. Through discussions with evicted residents and observation of villages undergoing demolition, I found that such effects were unevenly distributed as the direct results of constantly shifting changes in the village landscape. Citing how cadres and some families benefited from the process of village eviction and demolition, the Zhaos and other villagers were clear in identifying these evolving landscapes as manifestations of a process of development that was socially uneven and politically determined. For example, the processes of eviction, demolition, compensation, and resettlement are not uniform across all household cases. In anticipation of eviction, some families were allowed to establish separate householder registrations for younger family members who were not technically eligible. This enabled each to collect transition and relocation compensation. Others secured permission to expand the area to their homes in order to maximize compensation. Cadres negotiated their compensation packages in advance. By the time the demolition and relocation company was dispatched to deliver notice and document property for compensation, many well-connected households had already signed their papers and received their settlements.

The timing of resettlement relative to eviction is also critical to the experience and long-term outcomes of individual households. With months of advanced mobility, some of these families actually profited directly from their neighbors and evictees from other villages by becoming landlords. These differences in experience have significant direct impacts on household-level outcomes in relation to the village landscape in that some households benefited from the process of demolition itself. During the course of the demolition process, subcontractors for Beijing Construction staged the sorting of materials on the property of the first homes to be destroyed.[24] Subcontractors used partially demolished village space to cast concrete and process quicklime for road cement. In the process, many irrigation ditches were filled, while others were polluted with alkaline silt and the debris of land development. In this way, the transforming rural landscape became a medium through which the uneven effects of its political economy were *made and distributed as environmental*. Here, I mean to call attention to how social inequalities were unevenly reproduced in the physical environment, and how this process likewise continued to reshape differences in social and environmental experience.

These experiences show that eco-urbanization in Yixing is not merely a transformation of physical environments. Rather, rural residents must endure and take part in a years-long process of becoming urban and becoming green. The Zhaos' story presents basic empirical questions about the temporality of change and development in the region. Why had their land been requisitioned at that particular time? To answer this, it is important to call attention to the multiple dimensions of rural transformation that were underway. I have briefly touched on dimensions evident in the landscape, including road and infrastructure building, as well as changes to subsistence livelihoods. Less visible, however, are state mechanisms for managing rural land, its environmental value, and relationships to official goals of modernization and progress.

The official categories of rural land and rural society have been fundamental to state-society relationships since the 1949 revolution. Historically, the primary axis of this relationship centered on questions of production and national development. In policy, the urban-rural divide was made evident with the household registration system (*hukou*), which tied people to their parents' place of registration and restricted migration from the countryside to cities, and the constitutional bifurcation of urban and rural socialist land ownership. Now, under the logic of green development, the state is refiguring the rural in a process of "integration" with the urban. However, even as the rural takes on new meanings in official policy, the process is reconstituting the historical inequalities and biases that have marked the urban-rural divide. These changes and their immediate effects are the focus of the remaining sections.

Refiguring and "Circulating" the Environmental Value of Rural Land

Classical and contemporary theorists have wrestled with the peculiarities of land.[25] As a resource, land must be "assembled" through various institutions, practices, and fictions.[26] This section provides brief historical context for how contemporary practices of village land dispossession have intensified despite increasing conflict and central government concern. The section then analyzes the work of land management quotas in refiguring the rural from a site of socialist production into one of environmental resource optimization. Here, I argue that the party-state has sought to maintain local-level economic growth and competition while balancing agricultural land loss by making rural land into a nationally governed environmental resource. This balance is accomplished, on one hand, by giving localities de facto authority to reorganize agricultural production and to sever collective land ownership, and, on the other, by accounting for and maintaining the total area of arable land within the country as a whole.

This "dynamic balance" of arable land conversion and protection is maintained through a quota system.[27] Quotas for arable land conversion, replacement arable land, and prime farmland protection are passed down through the vertical hierarchy of the Ministry of Land and Resources.[28] This emphasis on a total area metric has roots in Mao-era efforts to expand farmland through massive landscape transformation projects during the infamous Great Leap Forward. But the reliance on arable land area as the definitive indicator of production capacity has a more recent history embedded in the neo-Malthusian imagination. Calculations of population growth and strains on economic production had been debated in China since the late 1950s.[29] With the 1995 publication of *Who Will Feed China? A Wake-up Call for a Small Planet*, Lester Brown renewed international concern over global "carrying capacity" and called attention to China's rapid loss of farmland.[30] The Chinese central government responded by initiating a land survey that was completed in 1996 and revamping the fragmented land regulation system. The 1998 Land Administration Law produced centrally legible and allocable national land resources. This universalizing grid would also ostensibly protect villages from illegal dispossession by local-level governments by requiring approved plans for farmland protection and conversion.

The limits set on conversion of farmland to other uses have been tied to calculations of grain production and food security since the 1997–1999 national moratorium on farmland conversion.[31] In 2006, this calculation was codified in the national minimum "redline" of 120 million hectares of total farmland. The national land regime's main policy instrument for maintaining this threshold is the centralized and hierarchical distribution of quotas for planned farmland conversion, preservation, and replacement mentioned above. Quotas are allocated by the Ministry of Land and Resources downward to provincial bureaus, which subsequently distribute targets for preserving prime farmland and *producing* replacement arable land down through the administrative hierarchy to the township level. Quotas are then implemented according to yearly city land-use plans.[32] Farmland conversion must be cleared on a project-level basis by city governments. Plans and target verifications are passed back up to provincial authorities for reconciliation of a net-zero loss (see figure 12.4).[33] Complicating matters, the Land Administration Law divides farmland into two general categories of "prime" and "nonprime."[34] Each jurisdiction must protect a minimum of 80 percent of its total arable land as designated prime farmland. By law, prime farmland must be delineated for protection in land use master plans and physically marked so that the public can readily identify the plots. Prime farmland is productive, well-irrigated cultivated land for crops and vegetables, and cannot be converted to other uses including aquaculture and orchards. The Land Administration Law further stipulates that state requisitions of any prime farmland, arable land over thirty-five hectares, and any land over seventy hectares requires approval by the State Council. However, because the law allows for exceptions for key infrastructural projects, local governments began to devise methods for maintaining a surplus amount of farmland that could be designated as prime to balance conversions. According to law, this practice requires the "construction" of replacement farmland. In practice, local bureaus account for and "bank" area quantities of land that can theoretically be designated as replacement farmland (see figure 12.4). As with compensation housing, replacement farmland is rarely ever completed before dispossession and land use conversion as stipulated by law. In many cases, prime farmland that is no longer possible to farm due to adjacent land use changes or severed irrigation systems retains its designation as protected prime farmland (see figure 12.5) These examples signal that the *designation* of farmland is frequently more salient—if not actually equivalent to—actually cultivated land.

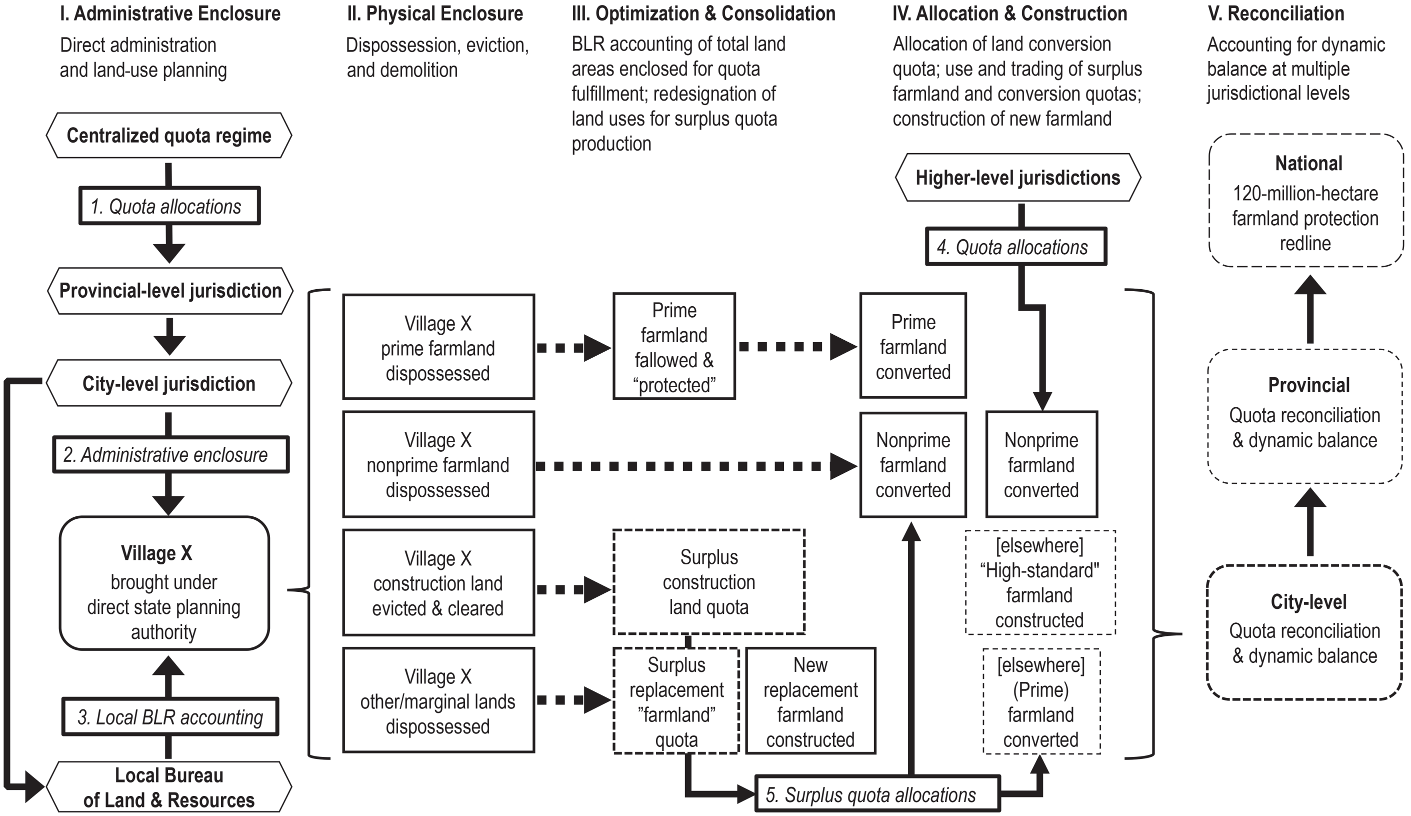
I. Administrative Enclosure
Direct administration and land-use planning
II. Physical Enclosure
Dispossession, eviction, and demolition
III. Optimization & Consolidation
BLR accounting of total land areas enclosed for quota fulfillment; redesignation of land uses for surplus quota production
IV. Allocation & Construction
Allocation of land conversion quota; use and trading of surplus farmland and conversion quotas; construction of new farmland
V. Reconciliation
Accounting for dynamic balance at multiple jurisdictional levels
Centralized quota regime
1. Quota allocations
Provincial-level jurisdiction
City-level jurisdiction
2. Administrative enclosure
Village X brought under direct state planning authority
3. Local BLR accounting
Local Bureau of Land & Resources
Village X prime farmland dispossessed
Village X nonprime farmland dispossessed
Village X construction land evicted & cleared
Village X other/marginal lands dispossessed
Prime farmland fallowed & "protected"
Surplus construction land quota
Surplus replacement "farmland" quota
New replacement farmland constructed
Higher-level jurisdictions
4. Quota allocations
Prime farmland converted
Nonprime farmland converted
Nonprime farmland converted
[elsewhere] "High-standard" farmland constructed
[elsewhere] (Prime) farmland converted
5. Surplus quota allocations
National
120-million-hectare farmland protection redline
Provincial
Quota reconciliation & dynamic balance
City-level
Quota reconciliation & dynamic balance

Figure 12.4

Overview of Bureau of Land and Resources Practices of Land Consolidation and Surplus Quota Production and Banking. The figure illustrates how processes of village land dispossession allow land managers to change land use designations and flexibly translate them into various surplus land use quotas for later allocation and maintenance of "dynamic balance." Figure by Jia-Ching Chen.

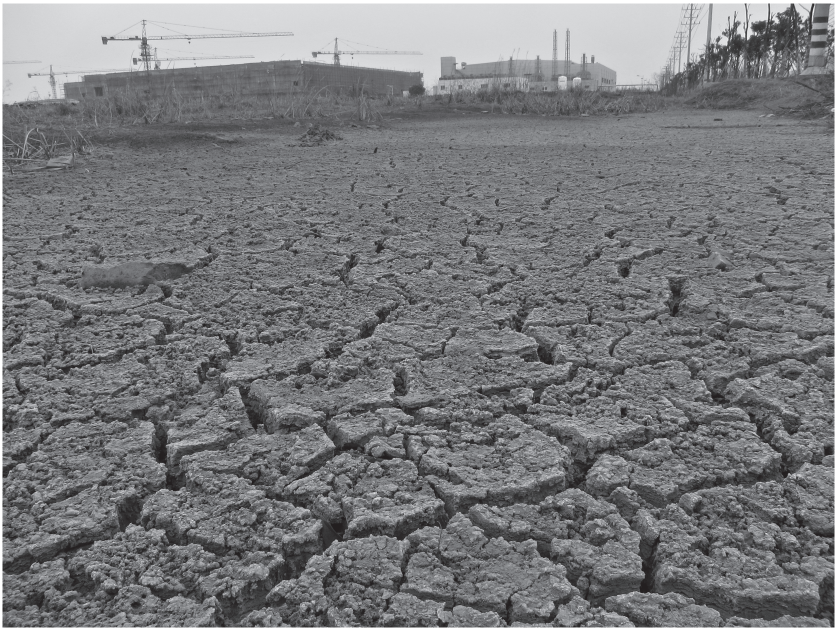

Figure 12.5

Fallowed "prime farmland." Infrastructure construction frequently leads to prime farmland being cut off from irrigation and fallowed even before it is requisitioned for construction projects. The area is still held by the village collective and is classified as "prime farmland," as it has not been converted to another use. Photo by Jia-Ching Chen, 2011.

Within the Jiangsu provincial context, Yixing has the lowest per capita level of farmland at 0.031 hectares per person compared to a provincial average of 0.064.[35] Yet, Yixing is the main site for the maintenance of prime farmland quota in the western Taihu basin. The Wuxi Prefectural Bureau of Land and Resources calls Yixing the "primary battleground" for the protection of prime farmland and for the construction of replacement farmland, emphasizing that the location of prime farmland should be maintained, its quantity should not be diminished, and its quality should be raised.[36] These points all reflect basic policy on farmland protection at the national level. However, by integrating projects to improve agricultural land quality and efficiency of land use, eco-city planning efforts have aimed to justify village land dispossession and the conversion of prime farmland.

In order to skirt the policies on prime farmland protection, the Zone has created projects for constructing "high-standard prime farmland." Developed with engineered soils, the newly produced farmland is designated as equivalent to prime farmland and can therefore be used to justify the "relocation" and "consolidation" of actual prime farmland, which is strictly protected from conversion to other uses.[37] Sun Dian, the director of the Wuxi bureau's agricultural land planning and protection department, states that the construction of such high-standard farmland is aimed at intensifying production and generating economies of scale. He further emphasizes the notion that farmland should be "consolidated."[38] Moreover, Sun's discourse on land use efficiency and productivity links arable land to the health and prosperity of future generations and the problem of "grain security" (*liangshi anquan*).

However, rural land consolidation is primarily driven by the imperative of development. The timelines of urbanization and private enterprise development demand predictable quota allocation and farmland replacement. Consolidation enables such smoothing by redesignating village-built spaces and marginal lands as replacement farmland, thereby yielding a "surplus" that exceeds assigned quota targets. In practice, this means that actual agricultural productivity becomes secondary to the availability of a plot of land for use in the production of quota surpluses. For example, Yixing's original high-standard prime farmland project was subsequently canceled when local government appointments shifted in 2012. While it has since been replaced with a project planned in conjunction with the Wuxi prefectural government, the temporal dislocation calls into question what is being "replaced" (*buchong*). In the operation of the quota regime as a centralized and national quantity, farmland is stripped of specific locational attributes apart from its jurisdiction. This means that features such as cropland productivity or irrigation are discounted. Stripped of its place-specific attributes (such as its history of cultivation, productivity, market or other infrastructures, and so on), land is reduced to a fungible quantity, and its now disembedded environmental value is recorded on paper for "circulation" through the quota system. However, this effort at creating a unified fungible quantity necessarily confronts the reality of the land itself. Even as such a system of state legibility *does* shape the landscape and material relationships, land as a commodity, as Polanyi asserts, is necessarily a "fictitious" one, as something not originally produced for exchange and whose complete value in social-environmental relationships cannot be captured by a fungible quantity.[39]

This provides us with a new perspective on green development. Yixing's process of eco-urbanization has relied upon an explicit "greening" of rural land that simultaneously upholds goals of agricultural production while denigrating smallholder production and livelihoods as environmentally inefficient. Rural land is refigured as a resource category, requiring active and direct state-led governance. As the producer of the largest share of Jiangsu provincial replacement farmland quota for years, Yixing is pivotal to the implementation of the national quota system and the ultimate accounting in the balance sheets of the central Ministry of Land and Resources. But the work of the local Yixing Bureau of Land and Resources (BLR) in balancing land use conversion requisitions, as well as in recording consolidation and replacement projects, is not limited to fulfilling its quota obligations. Rather, the Yixing BLR plays a much more active role in that it justifies, based on environmental policy, the consolidation of village land in one locale so that farmland elsewhere can be converted into other uses (see figure 12.4). This extends the local governmental role far beyond its implementation of central policy. It means that the work of municipalities in developing and administering the quota system for managing land supply defines the substantive basis of what the central land policy is actually governing.[40] This in turn allows us to understand how quotas for rural land use and farmland conversion enmesh land into an ecological game of net sums.

Observing the politics of land administration, both village residents and government officials readily identified how the work of the Yixing BLR plays two separate roles at the intersection of local jurisdictional and vertical ministerial agendas.[41] At the local level, the BLR accounts for land resources and quotas, facilitating project approval for land conversion. Under the centralized bureaucracy, the BLR ensures that replacement farmland quota obligations are met and that protected prime farmland is not converted to other uses. Rural residents frequently identify the failure of "regulation" of illegal farmland conversion as corruption. Villagers spoke daily about how a good deal of land churning is enabled by collusion between township, subdistrict, and village officials with local bureaus of the Ministry of Land and Resources (MLR), which frequently adapt implementation rules to the specific needs and conditions of local government development projects.

For instance, the BLRs and the Yixing municipal authorities failed to notify village collectives of protected prime farmland locations and to clearly mark their boundaries. [illegible]

[illegible] provincially held conversion quota was allocated to Yixing's special economic zones (SEZs) to facilitate joint venture project timelines. In [illegible] this strategy ensured the investment of a German technology company in the construction of a next-generation solar manufacturing facility.[45] Land subsidies, facilitated project approval, and the longer-term infrastructure development presented by the eco-city model also won the establishment of a national solar photovoltaic manufacturing and research base for Guodian, one of the five national state-owned utilities.[46]

The Land Quota System and "Consolidation" of Village Lands

The emergent model of eco-urbanization in China, as we have now seen, is centered on urban-rural integration with ostensible improvements to physical infrastructure and the human environment.[47] Within this context, the Yixing's eco-city project, and its effects on the Zhao brothers and others like them, is only one piece of a larger master plan that includes its two national state-level SEZs, which target the development of environmental

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into the wilderness as an aesthetically and pedagogically superior form of urban nature.

While these [illegible] unexpected twists produced by the coming together of disparate elements and contingencies, [illegible]

[illegible]

Acknowledgments

Thanks to Hendrik Ernstson for his close engagement with this work.

Notes

1. Krishen 2006.

2. Gold and Gujar (2002) have analyzed how villagers in Rajasthan differently value *vilayati* (foreign or imported) *keekar*—*Prosopis juliflora* (mesquite) is a native of Mexico—and *desi* (native or indigenous) *keekar* (*Acacia nilotica*), also called *babool*. *P. juliflora*'s thorns and inedible leaves keep browsing animals away, making it useless for pastoralists seeking fodder, whereas *Acacia nilotica* yields fodder as well as an edible gum. Gold and Gujar argue that *desi* and *vilayati*—native and foreign—are binary categories that organize perceptions of modernity in rural India, especially with respect to agrarian environments and species.

industries, the establishment of environmental buffers, and the promotion of intensive nonvillage agriculture by contract farmers and agribusinesses. In order to move such disparate objectives forward, local authorities are given quotas that can be used for construction of housing, public facilities, infrastructure, and industry. Given that the vast majority of land in the region was designated primarily as rural land held by collectives, the Yixing government has had to requisition village construction land and farmland to meet its nonrural land use needs.[48] Because conversion of farmland is more strictly regulated and must conform to farmland preservation regulations, provincial and central government approvals for conversion are increasingly difficult to obtain. Under the quota management regime, sites of "replacement farmland" must be identified before conversion of existing farmland takes place. This leads local governments to rely on the "consolidation" of villages into new urban settlements as a means to rationalize the total land supply within their jurisdictions under a single planning authority. This approach conforms to the national policy of "Three Consolidations" (*san jizhong*), which promotes the movement of rural populations into urbanized settlements, rural industries into industrial zones and cities, and farmland into larger-scale holdings.

The most direct path for local authorities to achieve such "rationalization" entails taking over village-held construction lands and resettling residents into dense housing districts like Dongjiao Gardens. The objective of this process is to allow construction projects to proceed elsewhere. In Yixing (and elsewhere in China) such transfers of village construction land and their subsequent consolidation for producing farmland quota do not follow an observable geographic arithmetic. Xu Fan, a staff member in a subdistrict office of the Yixing BLR who is responsible for handling many of the Zone's land use requisitions, explained that even within a locality, a unit of farmland conversion cannot always be tied to a specific corresponding unit of replacement farmland. Even to local BLR functionaries like Xu, the practice of balancing quota allocations is an opaque matter. In addition to maintaining a set quantity of farmland over a given planning period, local jurisdictions are mandated to maintain a net-zero loss in farmland resulting from conversions. However, the provincial government allocates quotas for construction-land conversion and farmland protection on an unequal basis. This allows the province to maintain its "dynamic balance" of farmland according to the central government plan while optimizing spatial structure for urbanization, industrialization, agricultural production, and environmental protection.

In a place like Yixing, where demand for construction land is high, local staff facilitate the process not only through the transfers of village construction land mentioned above, but also by maintaining an underreported positive balance of quota.[49] To illustrate this to me, Xu Fan hand-annotated a copy of the official spreadsheet for ongoing replacement farmland quota production in seventeen villages. These quotas are also "produced" by utilizing "consolidated" village lands that become available for reallocation following eviction and demolition. In the car park outside the offices, beneath a sign that read, "Use land frugally and intensively, hold fast to the farmland redline," Xu showed me that the hand-annotated totals "production" exceeded the official current tally for those villages by 261.62 hectares. In four other land consolidation projects for completion in 2012, Xu expected to tally 783.56 hectares of village farmland and 376.05 hectares of village construction land off the books. Such "surplus" land allowed the municipal BLR to confirm that construction-land quota was readily available to meet land requisitions without utilizing farmland conversion quota or construction-land quota allocated from above. More importantly, this practice of accounting for "replacement" farmland allows the BLR to facilitate project approval where farmland conversion is occurring. Xu described this as "circulating" (*liudong*) farmland, calling into sharp relief the notion that land could be made fungible.

As I left the BLR compound, I pondered the red character slogan painted on the wall: "All people participate in founding the ecological city."[50] What types of "participation" are elicited by Yixing's eco-city building? Elsewhere in the Zone, dozens of construction projects were in varying stages of being imagined, planned, approved, and built. Among these were three solar photovoltaic cell and panel manufactories that had just been sited on village lands enclosed in 2006–2007 (see figure 12.2).[51] The Zhaos, their village cadre leaders, and workers recently hired into new green industries all have divergent experiences of participation. Read with an imperative overtone, the slogan calls attention to the differential treatment and outcomes experienced by "all people." Moreover, this generalized process of "founding the ecological city" papers over the fact that such differently situated social actors and processes also produce a diverse array of long-term effects and harms. These social-environmental fissures in the foundations of the

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ecological city are visible in the landscape and have material effects that are yet to be fully understood and accounted for in relationship to the goals of sustainable development.

To return to the issue of farmland, while the delicate geography of "dynamic balance" is not clearly mapped, its uneven spatiotemporality is quite observable in the enclosed but undeveloped village lands piled with rubble and in the proliferation of approved but unconstructed projects for fallowed fields—fields that are designated as "protected" in the operation of the quota system (see figures 12.3, 12.4, and 12.5). This means that though a given parcel may no longer *function* as farmland, it also does not yet require an expenditure of conversion quota. This gap between the land itself and its accounting in the quota system as two distinct aspects of the farmland conversion process highlights the tension arising across the local and national scales of environmental and resource governance. They also serve as clear examples of how the ultimate object of central policy regarding farmland protection is not any given site of farming and livelihood, but a national aggregate indicator of capacity.

Whither Paradise? The Social and Economic Outcomes of Dispossesion and Relocation

Dongjiao Gardens will house over 15,000 dispossessed residents from seven villages within the Zone when construction and resettlement are completed. Almost all of them had resided within the twenty-two square kilometers requisitioned for the first phase of the Zone's eco-city project, dubbed the "Scientific Innovation New City" (*ke chuang xin cheng*).[52] Regardless of official representations such as those in the chapter epigraph, the Zhaos experienced this new "paradise" as remote and incomplete in physical and cultural terms. Dongjiao sits miles beyond the eastern fringe of the urban core. For years after the first two phases were completed and occupied, Dongjiao comprised an isolated grid of residential blocks with almost no planned services. Approximately thirty-five thousand more dispossessed will be housed in three other resettlement districts in the Zone. These projects transpose previous patterns of urban-rural inequality into new spaces of peri-urban segregation.

With the loss of access to land and livelihoods, villagers are forced into a new, more proximate, and yet more explicitly marginalized relationship with the city. In some cases, dispossessed villagers are commonly referred to as a new "underclass" characterized by "three withouts": without land, without work, and without full social benefits. Moreover, a class of "four withouts" is also emerging as some villagers lose permanent housing as an entitlement of collective property. Because Yixing's current compensation system requires dispossessed families to pay for the difference between the "market prices" of their demolished homes and their relocation housing, many families are frequently impoverished in the process. Poor families are frequently unable to pay the fees, and the "compensation" for their demolished homes is diminished in the process as the money is tied to a compulsory mortgage system for the relocation housing and they spend down meager savings on transitional housing. Thus, some families are left with no option other than to attempt to sell the property through a broker. However, as no preestablished market exists for the resettlement housing apart from renting to recently displaced families, this is generally unsuccessful. Many families are forced to purchase a home farther outside of the city. Others move in with relatives as circumstances allow.

In discussing the green development rationales of improved living standards, new clean industries, jobs, grain security, and environmental protection, the Zhaos and other older villagers display a remarkably sanguine view of social progress in spite of a perceived inevitability of dispossession and potential hardships for "us common folk" (*laobaixing*). Although they have virtually no chance of securing permanent employment in the Zone (even in services, much less in one of the new "greentech" industries), many expect that their children will do better. Nonetheless, in describing the actual processes of eviction, compensation, and resettlement, many expressed outrage over the violation of their property, rights, and dignity, as well as incredulity over the exclusion of farmers from "professional agriculture" as production is reconfigured around large-scale, high-yield cultivation methods.

Illustrating this point, the Zhaos' neighbor, Mrs. Yang, recounted that she was notified of eviction only a month before the harvest season of 2008. As we made our way a kilometer down Qingyuan Boulevard to the site of Sizhuang village, where Mrs. Yang returned every other day, she explained:

> We tried to appeal to the leaders to delay the demolition a few weeks. . . . They won't listen to reason. . . . Our village chief is a good person, but the cadre at the head of Xuewei [the administrative village]—he doesn't know us and we don't know him. . . . Even before we signed [the papers for settling compensation], we were told that they had already contracted our farmland to a woman from Zhejiang.

For leasing her household's farmland, the Yang family receives an annual ¥400 (US$58) from the Yixing government, and ¥250 (US$36) from the contract farmer. However, like many households in the region, they still produced primarily for subsistence and the cash does much less in the face of uncertainty and their rapidly increasing cost of living.

Zhang Ting, the contract farmer, leased paddy fields for wheat and rice from three villages totaling over eight hectares (roughly the holdings of sixty families). In 2010, her market price and contracted procurement price by the State Grain Reserve rose about 30 percent over the previous year with incentives for contract farming. Because of her economies of scale and the spike in prices, she earned 61 percent more per unit area compared to Mrs. Yang and her fellow villagers who harvested in 2008 to 2009. Such a difference cannot be attributed simply to the function of market mechanisms. Rather, the account above shows how the restructuring of grain production has taken place through extra-economic means of force, far outside the ambit of "the dull compulsion" of the market described by Marx.[53]

Retreading her two-year path through the decorative landscaping of flowerbeds and pregrown trees that fringe the rubble of her village, Mrs. Yang and I passed beneath a billboard that proclaimed: "New Talent, New Industry, a New City" (see figure 12.6). Mrs. Yang set a tattered plastic bag with a small trowel and a clipper on the edge of her vegetable patch. Beyond a mound of broken weeded bricks, she pointed and blinked her watering eyes at what appeared almost as a mirage: a bright green-yellow field of mature rice. "Mrs. Zhang will be coming to harvest very soon. She owns tractors and will bring five or six workers to finish it very quickly."

Conclusion: Toward a Grounded Political Ecology of the Global Green Economy

In 2010, prominent billboards featured the exact Kobelco tractors used by Beijing Construction and the local demolition and relocation company to reshape the Yixing countryside (see figure 12.7). The advertisement, also common throughout Shanghai and Beijing in 2010 and 2011, proclaimed, "A green future is deepest in my heart," alongside a picture of a child drawing an idealized natural landscape unfolding incongruously beneath a backhoe. Beyond, a city floats among clouds in a field of white space. The composition recalls traditional Chinese landscape painting, but inverts its the organization's early involvement with the Ridge remained a defining moment in its biography, when Khanna and others realized that it was wilderness that they loved, not a park. How this sensibility set them apart from other upper-middle-class people, and how it evolved into a critique of industrial capitalism and its consumerist culture, leading to a stand against "destructive development" in rural India, is a complex story.[37] But central to it is the sensual experience of the Ridge in the early morning, its tangled wildness a contrast to the ordered, populated park.

Since the 1980s, the Ridge has faced new threats and recruited new champions. Kalpavriksh has shifted base from Delhi to Pune, but other organizations and alliances, formal as well as improvised, have taken up the cause, focusing primarily on preventing further construction on the Southern Ridge, an area now surrounded by affluent neighborhoods, where residents have become concerned about dwindling greenery and aquifers.[38] One such campaign highlights the unintended ironies of the situation. During the lead up to the Commonwealth Games in 2010, the Delhi government planned to expand the sports facilities that it had constructed for the Asian Games in 1982 by clearing an adjacent section of the Ridge. They encountered vehement opposition, including a public-interest petition filed in court, from residents of nearby Siri Fort Village, a low-key yet luxurious haven in a prestigious location inhabited by members of the elite. As the residents denounced the Delhi government for its callous destruction of greenery, they chose to forget that the spacious bungalows in which they lived had been built less than twenty years ago by exactly the same process—clearing the Ridge.[39] Siri Fort Village was carved out of the Southern Ridge to house visiting athletes and sports officials during Asiad '82. After the games were over, the houses were sold at well below market rate to senior bureaucrats and their cronies and relatives. Beneficiaries of that process now reinvented themselves as saviors of the city's green areas.

Conclusion

As Mangarbani and the Delhi Ridge change and are threatened with change, they bring into being new allegiances and alliances.[40] These green spaces and the urban publics who cohere around them have shaped and transformed each other. Reconfigured relations in the ecological and social landscape have had uneven effects. The domestication of the wilderness of

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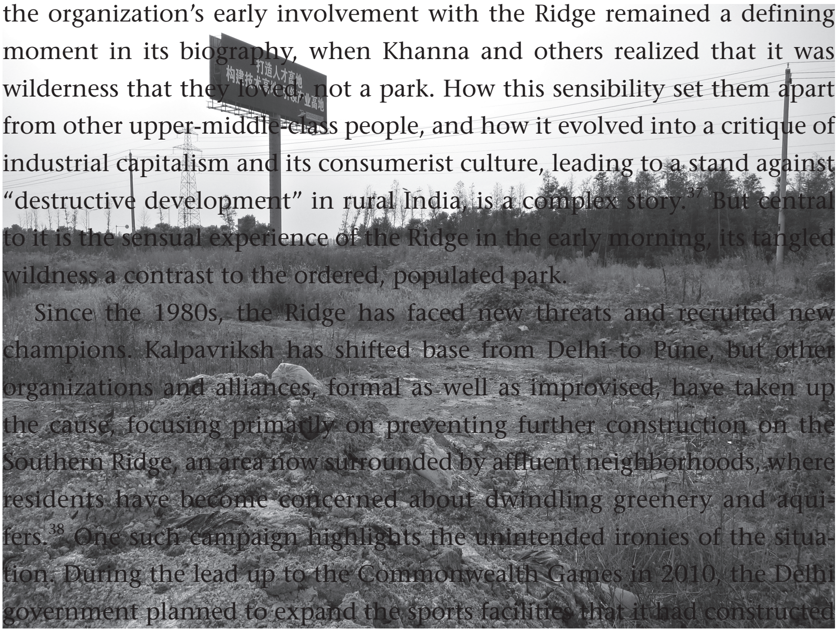

Figure 12.6
The site and remaining rubble of Sizhuang village. Sizhuang village, in the eastern district of the Zone, was demolished in 2008 to make way for Dongjiu Boulevard, which runs along the western edge of the Dongjiao Gardens resettlement estate. A pile of trash and leftover rubble from the village remains. This 2010 billboard reads: "Build the commanding heights of talent, construct the commanding heights of technology, lead in the commanding heights of industry"; on the reverse side, "New Talent, New Industry, a New City." Photo by Jia-Ching Chen, 2010.

usual relationships of a "closed and formal world of man" in the foreground with a "spacious nature . . . a world of shifting light . . . fading to infinity" in the background.[54] Here, the white space marks the ambiguous, shifting unity of a metaphysical urban and a closed and formal nature. The imagery suggests a narrative of creative destruction as the sole means to achieve the "green future," and an idea of nature as one that requires physical intervention to be green. It is a visual allegory, highlighting the symbolic and material refigurations wrought by green development by dispossession.

In bringing together the experiences of the Zhao brothers and their loss of land, with the high-level administrative construction of fungible land in China, I hope to ground China's emerging urban nature—a dream world of

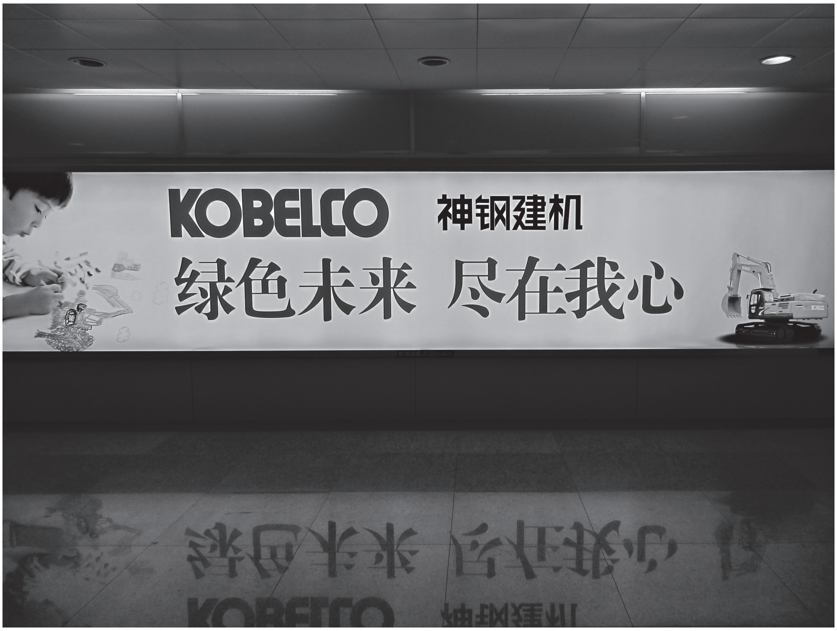

Figure 12.7
Kobelco "Green Future" advertisement posted in the Shanghai subway system. Photo by Jia-Ching Chen, 2010.

ecological harmony, industrial innovation, and technocratic efficiency—in the astounding material and symbolic refiguration of the rural people and places upon which it is built. Collectively owned farmland is turned into factories for the production of solar cells for the global market and the emergence of a new middle-class "ecological lifestyle." In these concluding remarks, I would like to raise the question of how these grounded observations connect to global figurations of environmental value and improvement.

The ideology of green development that links rural transformation to the construction of "environmental" industries is tied to the global market for carbon reduction. Starting around 2007, expanding subsidies in the European Union and the United States underpinned the rapid construction of China's solar industry. In China, direct subsidies in land leases and cheap financing (itself bolstered by state-rentier capital) contributed significantly to China's touted "green leap forward."[55] In the course of only a few years, China expanded its solar PV manufacturing capacity nearly fiftyfold from around 1 gigawatt in 2007 to an estimated 49 gigawatts in 2013.[56] Using such means between 2007 and 2011, Yixing built approximately 5 percent of the global manufacturing capacity for PV solar panels. This irruption inserted China's national agenda on green development into global markets for renewables, including carbon credit projects for solar farms certified by the Kyoto Protocol Clean Development Mechanism. However, this success created a crisis of overproduction, and between 2010 and 2013 prices dropped 350 percent faster than predicted. The crash led a crisis of overcapacity, with bankruptcies and the loss of billions in cash as fixed capital as plants were shuttered. In 2012, a report by GTM Research estimated that 180 solar panel manufacturers would go under, 54 of them in China.[57] On the heels of major bankruptcies, including of Solyndra, a company that received US$536 million in federal loan guarantees, American solar companies filed antidumping suits against Chinese suppliers. In its 2012 findings, the United States proposed counter-tariffs of 31 percent on imports of solar panels and solar cells from China. In 2013, the EU imposed an average tariff of 47 percent on Chinese PV cells, panels, and silicon wafers.[58] The two main companies named in the dispute are based in Jiangsu: Wuxi Suntech and Trina Solar. Suntech was the world's largest producer until it declared bankruptcy and defaulted on US$541 million in bonds in March 2013 as a direct result of the global overcapacity crash.[59] The tariffs substantially increased the costs of solar energy and spurred new efforts at international cooperation at the 2015 UN Climate Change Conference in Paris.

These contradictions between national economic development and local environmental and social outcomes in China's environmentalization are indicative of the larger contradictions of China's "green capitalism" in a global context. Briefly, I argue that these contradictions are:

1. *Exporting sustainable development*—the actual environmental sustainability of "green" manufacturing industries is often not weighed in terms of local impacts, and privileges end-of-chain outcomes (such as installed capacity of solar panels).
2. *Legitimation of dispossession and enclosure*—green discourse is used by local government officials as a basis for political legitimacy and to justify ongoing processes of capital accumulation by state force.
3. *Anti-rural bias*—as green discourse is used by developers and government officials to justify land conversion for development and environmental governance, "green" is increasingly equated with a master-planned

optimization of urban-rural space, thus reinforcing previous figurations of the rural as "backward."

4. *International political legitimation*—as China receives increased global recognition for its achievements and potential in greening industrialization and urbanization, perceptions of its authoritarian political system as a means of achieving these ends are normalized. Here, I do not mean to characterize the Chinese state as monolithic and totalitarian. Rather, this point emphasizes the ways that different levels of government and problems of governance (that is, environmental protection, rural urbanization, and green industrialization) are sites of friction or contestation, where social and political dynamics are refigured in relation to green development.

These contradictions suggest potential conflicts between different scales of sustainability objectives. As village fields are plowed for solar farms and forests of carbon credits, tensions between a so-called global green economy and local economic and environmental outcomes are clearly discernable.

China's environmental agenda is not merely a political rationale for justifying dispossession. It is reshaping global resource geographies. Environmental political economies call our attention to how the industrial production of resources takes place and how it entails the construction of new urban natures. If we take for granted that cities have historically been founded for different locational advantages, grow through the slow accumulation of various types of surplus, and subsequently birth new forms of sociality, then China's examples of master planned eco-urbanization circumvent the processes of accretion and change for the amplification of a single agenda. This is an agenda that has broad international support and a mandate underscored by the politics of crisis. At its largest horizons, green development purports to remake the environmental bases of production and, therefore, of value and accumulation. If, as Harvey suggests, the city is the historic place where the world can be "re-imagined and re-made," then that imagination must encompass an understanding of how global environmentalization is producing and connecting new urban and rural natures.[60]

As "green" is increasingly adapted and linked to China's ideology of socialism, I argue that it plays a role in refiguring social values and perceived entitlements, especially rural land tenure and livelihoods. In his analysis of China's agrarian contradictions, Cao Jinqing argues that because village smallholder agriculture cannot compete effectively in global capitalist markets, to which they are nonetheless tied for inputs and sales, smallholder production with land privatization "would lead to rural poverty, unrest, and growing inequality, not agricultural efficiency and smooth urbanization."[61] In attempting to resolve this contradiction, the Chinese state is using a combination of dispossession and the creation of a social safety net for the rural residents who are faced with these rapid and radical changes. This safety net, including the minimum subsistence allowance (*dibao*) and the expanded rural pension championed by Wen Jiabao, helps to secure compliance with forceful dispossession. In this regard, the emerging figuration of the rural may harken early conditions of China's move to a post-socialist political economy and its rise as an environmental leviathan.

Acknowledgments

In addition to valuable comments from all the contributors in this volume, I appreciate insightful suggestions from Amita Baviskar, Ricardo Cardoso, Mona Damluji, Henrik Ernstson, and Hun Kim on various aspects of this chapter.

Notes

1. Kobelco equipment, manufactured in joint venture factories in Sichuan and Hangzhou, is pervasive in demolition and construction sites across the country.

2. Names of people and some places have been modified.

3. I draw on Haraway's (1992) analytical approach to figuration.

4. Rabinow 1989, pp. 7–16.

5. Chen 2013b.

6. Land dispossession is the leading cause of social unrest, with tens of thousands of protests amounting to 65 percent of officially recorded "mass conflicts" each year (Yu 2005; He 2010; Chen 2013a, 2017).

7. See Chen (2017) for a discussion on the institutionalization of these practices.

8. Zhang 2002, p. 62.

9. The Zone was founded under the Yixing municipal authority in April 2006. It was promoted to provincial level status in July of the same year and was designated

a national level economic and technological development zone in March 2013 by the State Council.

10. Yixing Municipal Government 2006; Xu and Ling 2010.

11. The phrase "ecological construction" (*shengtai jianshe*) is a contraction of the slogan "construct an ecological civilization." The party-state has enshrined ecological construction as a pillar of its ideology of socialist development, "merging comprehensively with national economic construction, political construction, cultural construction and all aspects of constructing society" (Xinhua News Agency 2012, n.p.). See also National People's Congress (2016); Central People's Government (2017).

12. See Xinhua News Agency (2012); National People's Congress (2011, 2016); State Council (2010, 2014). For Li, an early proponent of environmental protection evaluation criteria for party officials, eco-urbanization in Yixing and other model cities is also fundamentally about reshaping the party-state itself around the official ideology of ecological civilization; see, for example, Yixing Administrative Bureau (2010).

13. National People's Congress 2011; Xinhua News Agency 2012.

14. As of this writing, online sources for these data under the Ministry of Environmental Protection domain (www.mep.gov.cn) are no longer available. On March 17, 2018, the ministry was reorganized as the Ministry of Ecology and Environment. Since April 2018, the previous site has redirected to a new domain (www.mee.gov.cn) without support for old links. The new ministry has an expanded regulatory purview, notably taking over climate change mitigation from the National Development and Reform Commission; see www.mee.gov.cn.

15. See Bramall (2007); Buck (2012).

16. For examples in national policy, see the opening paragraphs of the National Land Use Master Plan (Ministry of Land and Resources 1997, 2008a; YBLRYixing Bureau of Land and Resources 2010) and the 1998 revision of the Land Management Law, which refers to land management in the context of ecological protection and improvement and the "ecological environment" of agricultural production. These broadened environmental resource concepts are reflected in the 1998 merger of the Ministry of Geology and Mining, the State Administration of National Land, the State Administration of National Oceans, and the State Bureau of Surveying and Mapping to form the Ministry of Land and Resources. See also, the inclusion of land in "environmental resources" in the Ministry of Environmental Protection (2008) guidelines for environmental impact assessment in land use planning.

17. On the latter point, see, e.g., Lin, Tao, and Liu (2006); Hsing (2010).

18. This treatment of "boundary objects" is influenced by Star and Griesemer (1989, p. 393), who, drawing on Michel Callon's and Bruno Latour's critical science studies,

speak of "scientific objects which both inhabit several intersecting social worlds *and* satisfy the informational requirements of each of them."

19. This dual system is based on the socialist ownership of all land enshrined in the constitution, under which all urban land is owned by the state on behalf of the whole people, and rural and suburban land is held directly by collectives. For an overview of the land regulation regime, see Ho and Lin (2003). For a critique of its institutional failures, see, e.g., Lichtenberg and Ding (2008).

20. Over the past two five-year plans, ecological targets (*shengtai zhibiao*, or "ecological quotas") have been developed for a range of environmental and infrastructural goals including resource efficiency, project GDP per unit of converted rural land, wastewater treatment, and afforested green space. These targets and quotas are passed down from the central government to the provinces for fulfillment by local government units. In May 2013 at the Sixth Collective Study Session of the Chinese Communist Party Politburo, Xi Jinping advocated the establishment of "ecological redlines" (*shengtai hongxian*) as a policy translation of an imperative structural limit to development for the assurance of "ecological security" (*shengtai anquan*) and the recovery and growth of ecological service functions (*shengtai fuwu gongneng*). For an example of the application of a broad array of ecological quotas as integral to sustainable development and urbanization in Yixing, see the China Yixing Environmental Science and Technology Park Management Committee (2012) outline of its low-carbon ecological targets system, which includes thirty-six quantitative and nine qualitative targets.

21. Chen 2013a, 2013b.

22. Unless otherwise noted, approximate dollar estimates given at the 2008 average exchange rate, ¥1 = $US0.14.

23. In May 2013, Yixing was named a National Greening Model City for its afforestation work, including a 1,333-hectare "green screen" on the shore of Taihu Lake (see Min 2008).

24. This work took place under the management of Beijing Construction, a major state-owned enterprise. The Zone signed a build-transfer contract with Beijing Construction to complete all of the major infrastructure and much of the architectural construction within the Zone. This financing model is increasingly common in China and directly links local state-led rural land dispossession and speculative urbanization to large construction-finance institutions with strong ties at the central government level. Because such projects are increasingly embedded in the portfolios of large banks, this dynamic raises important questions about the valuation of land development projects and the stability of China's financial system.

25. See, for example, Marx (1906 [1867]); Smith (1976 [1776]); Polanyi (2001 [1944]); Li (2014); Levien (2018).

26. Polanyi 2001 [1944]; Li 2014.

27. In official policy discourse, the relevant phrase is "farmland takings and replacement dynamic balance" (*gengdi zhan bu pingheng dongtai*). This policy is summed up as "take one, replace one" (*zhan yi, bu yi*).

28. Arable land and prime farmland protection quotas: *gengdi baohu yu jiben nongtian baohu zhibiao*; replacement arable land quota: *buchong gengdi zhibiao*. In March 2018, the Ministry of Land and Resources (MLR) was reorganized and its functions were subsumed within the newly established Ministry of Natural Resources. As of this writing, its website homepage (www.mlr.gov.cn) is defunct. While some webpages (currently) persist under the original addresses, much of the data that were previously accessible via MLR homepage menus have not been transferred or linked to the new Ministry of Natural Resources site (see www.mnr.gov.cn).

29. In her definitive ethnography of China's population science and policy, Greenhalgh (2008:41-55) notes that debates on state population control efforts were fraught with autocractic ideological rectitude, with Mao reversing his positions on population growth and control throughout the 1950s. A national dialogue on family planning and individual birth control was sidelined with the eruption of the Great Leap Forward and Mao's 1958 declaration that "for now, a large population is better" (ibid., 53). By the end of his life in 1976, Mao had assented, writing, "it won't do to not control population" (ibid.).

30. Expression of carrying capacity as a function of land area is now prominent in the concept of "ecological footprints" (Wackernagel and Rees 1996). For a review of the difficulties in reducing social-environmental relationships to a single land use metric, see Van den Bergh and Grazi (2013).

31. Further national environmental rationale is also clearly evident in "grain for green" programs that remove farmland and rangeland from production for erosion control and anti-desertification. Grain for green afforestation projects is increasingly monetized, including via global carbon credit markets. From 2006 to 2013, China registered five afforestation projects that will produce 8.8 million metric tons of CO_2-equivalent in Kyoto Protocol Clean Development Mechanism certified emissions reductions (CDM CERs) by 2041.

32. Jurisdictional cities exist at the county, prefectural, and provincial levels of administration.

33. The reconciliation of "dynamic balance" was originally intended to take place within each jurisdicational level. However, administrators in relatively land-scarce Jiangsu and Zhejiang provinces began practices for the banking and trading of quota-allocated land use rights between localities (Wang et al. 2010; Cai 2014). Cai (2014) provides a detailed account of the evolution of the quota system and the subsequent normalization of quota trading. Cai (2014, 2017) unpacks the structural

drivers of such inter-jurisdictional transfers of "flying land," highlighting the issues of local government finance and political tenure.

34. The term for "prime farmland"—*jiben nongtian*—is also frequently translated as "basic farmland." In the MLR translation of the 1999 law, the term is rendered as "capital farmland."

35. Jiangsu People's Government 2009.

36. Wuxi Bureau of Land and Resources 2011. Although Yixing is a county-level unit within the Wuxi prefectural jurisdiction, the prefecture and county territories are not contiguous. This highlights the prevalent practice of inter-locality management of land quotas and farmland dynamic balance.

37. The general process of land use optimization is referred to as land organization (*tudi zhengli*). Land and land use consolidation (*jizhong*) refers to the assembly of land for zoned uses. Farmland reclamation (*fuken*) and remediation (*zhengzhi*) are frequently used to describe projects that consolidate village construction and marginal lands for the flexible accounting of quotas for farmland preservation, construction and conversion, and construction land use.

38. *Ba nonyongdi jizhong* (Wuxi Bureau of Land and Resources 2011).

39. Polanyi 2001 (1944).

40. Wang et al. (2010, 457) cite Jiangsu and Shanghai as the originators in the late 1990s of rural land consolidation practices, which enabled local governments to exceed allocated quotas for construction land. Although the Land Administration Law (National People's Congress 1998) includes broad provisions for converting farmland outside of approved master plans (see Article 58) and encourages rationalization for efficient village land use (see Article 41), these practices still require notification to the State Council. Wang and Bai (2011) cite a 2006 pilot provision by the MLR to allow intra-jurisdiction rural land consolidation to be "transferred" to offset urban demand for construction land quota in Jiangsu, Shandong, Tianjin, Hubei, and Sichuan. This pilot program was extended to the rest of the country in 2008 (Ministry of Land and Resources 2008b; for futher details, see Cai 2014).

41. China's bureaucratic matrix is organized around vertical central government ministries known as "strips" (*tiao*, e.g., the Ministry for Ecology and Environment, the Ministry of Natural Resources, and so on) and horizontal territorial jurisdictions known as "blocks" (*kuai*, e.g., provinces and cities). Theoretically, provincial and local level bureaus report to their respective ministerial hierarchies, while territorial blocks are administered by the people's government of that jurisdiction. Ministry bureaus do not have binding authority over the regional governments within corresponding hierarchical levels. Local governments must also conform to the policies of larger subsuming governments. For instance, Yixing, a county-level city, falls under the jurisdiction of the Wuxi prefecture-level municipality, which is under

Jiangsu province. Local units, such as Yixing's government and its separate SEZs, operate with a great deal of autonomy in pursuing various results-oriented policy goals ranging from GDP growth to farmland preservation.

42. *Shang you zhengce, xia you duice*.

43. Min 2008b; Liu 2010.

44. Wuxi Municipal Party Committee 2009.

45. Interview with Yixing Economic Development Zone Director of Investment and Industrial Planning, Bureau of Foreign Investment, May 21, 2010; from author's fieldwork archives, interview: 20100521.YXZ.1.

46. Through 2012, the three successive phases of the Guodian projects brought over ¥12 billion (US$1.8 billion) of investment to the Zone. The combined manufacturing capacity of the Guodian projects reached 800 megawatts of PV cells and modules in 2012, an increase of 60 percent over 2011, which brought the Zone's total manufacturing capacity to over 3 gigawatts—about 10 percent of the 2012 national total.

47. These physical aspects are frequently conflated under the concepts of ecocity construction in China. A prominent example here is the Shanghai 2010 World Exposition slogan: "Better City, Better Life." There are also distinct cultural terms associated with greening such as "ecological civilization" (*shengtai wenming*) and "ecological living" (*shengtai shenghuo*). These ideas are highly aestheticized and are used to refer to cultural values of environmental consciousness as well as to an improved quality of life.

48. According to the *Yixing Land Use Master Plan (2006–2020)*, the total land area in Yixing in 2005 was 217,742.82 hectares, of which 55 percent was classified as agricultural land. Of 30,831.90 hectares of construction land, nearly 60 percent was held by village collectives, 32 percent was in townships, and less than 8 percent was classified as urban land under the direct planning authority of the municipal government. The plan has the goal of reducing village construction land by half by 2020 (Yixing Bureau of Land and Resources 2010).

49. Interview with Yixing Subdistrict Bureau of Land and Resources Staff, November 11, 2010; from author's fieldwork archives, Interview: 20101111.YBLR.1.

50. *Quanmin canyu chuangjian shengtai shi*.

51. At the peak of solar PV industry expansion in 2010–2012, there were six major cell and module manufacturers operating in the Yixing Zone, including a national state grid enterprise, Guodian, and global top-ten producers Trina and RenaSola. There were also several local state-backed incubator projects.

52. The project name plays on the use of the character for "new" (*xin*) in joining "creation and innovation" (*chuangxin*) to "new city" (*xin cheng*).

53. This often-cited passage comes from the discussion of "so-called primitive accumulation" in *Capital*, volume 1. Marx (1906 [1867], p. 809) describes the process in direct relationship to the social construction of the working class: "The organization of the capitalist process of production, once fully developed, breaks down all resistance. … The dull compulsion of economic relations completes the subjection of the laborer to the capitalist. Direct force, outside economic conditions, is of course still used, but only exceptionally. In the ordinary run of things, the laborer can be left to the 'natural laws of production,' i.e., to his dependence on capital, a dependence springing from, and guaranteed in perpetuity by, the conditions of production themselves."

54. Tuan 1977, p. 57.

55. For a decade now, experts and boosters have been pointing to China's combined economic power and political system as the largest—and perhaps most important—venue for the development of "a clean energy future" (Friedman 2010a; Finamore 2011). See Friedman (2010b) for one of many sanguine references to China's "green leap forward."

56. National manufacturing capacities estimated by Earth Policy Institute (http://www.earth-policy.org/data_center/C26) and Bloomberg (http://www.bloomberg.com/news/2013-09-08/chinese-zombies-emerging-after-years-of-solar-subsidies.htm). A one-gigawatt-capacity thermal power plant would provide electricity to over 700,000 US homes.

57. Analysis by GTM Research, a source of expert analysis on renewables markets, reported by Forbes (http://www.forbes.com/sites/uciliawang/2012/10/16/report-180-solar-panel-makers-will-disappear-by-2015/).

58. In 2018, the United States followed suit and imposed a 30 percent tariff.

59. International Trade Administration 2012.

60. Harvey 2003.

61. Day 2008, p. 56.

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V Conclusion

13 Grounding and Worlding Urban Natures: Configuring an Urban Ecology Knowledge Project

Henrik Ernstson and Sverker Sörlin

> There are two ways to lose oneself: walled segregation in the particular or dilution in the universal.
>
> —Aime Césaire, letter to Maurice Thorez, 1956

Central to this book are an urge and a curiosity to multiply the understanding of urban environments by taking in a wider urban experience. Rather than a global model that tries to grasp and decode urban environments in the same way wherever they appear, we have worked with the idea that what is required is an approach that sustains the multiplicity of urban nature, that affords and provides space for various ways of knowing and ways of being within and in relation to urban nature, and that produces an epistemologically and ontologically rich object of study, opening it toward conversations, collaborations, debates, and contestations. In a world that is urbanizing rapidly across a diverse set of cultural and biophysical contexts, it is crucial to open our understanding of urban nature toward a broader urban experience. At the very end of the volume, it is time to reflect on how the growing community who share an interest in urban environmental studies could move on in future work.

One way of taking the project forward would be to engage in a critical and constructive relationship with urban ecology as conceived within the environmental sciences. The meeting between scientific and narrative-based ways of knowing urban environments could focus on *how* knowledge is used in tangible conflicts and controversies. Sara Whatmore and the broader conceptual work built in the field of science and technology studies have opened one practical avenue. In her work on flooding in English towns, Whatmore brought natural and social scientific scholars and representatives from the public together, not because they had an established stake in the matter, but to form a "competency group." The group collectively and transparently elaborated on *ways of knowing* flooding and its many social, environmental, and historical factors with the aim of "redistribut[ing] expertise across the 'scientific'/'vernacular' divide."[1] This put the onus not on *what* is known, but *how* something is known. The grounding and worlding approach of this book would be an important companion in such efforts to contextualize, not discard, scientific ways of knowing.

Another important move forward is to ask not only for in-depth case studies from one city or physical location, which was how we conceived this book project as a first necessary step to gain textured accounts, but to more explicitly design studies that develop comparative "productive geographies," exploring how urban natures are local yet connected to other locations (see also chapter 1 in this volume).[2] Urban scholars have been busy in developing these comparative geographies, including, for instance, studies of "translocal" forms of urban struggles that have followed Slum-Dwellers International, an alliance of marginalized neighborhoods across Asian, African, and Latin American cities;[3] "mobile urbanism" that studies how urban policies, standards, and expertise move and are translated across the world to influence local dynamics;[4] and comparisons across the global South and North of processes that marginalize people from potable water access in Indian and Californian cities.[5] Such comparative work does not seek to find the same variables or factors applicable everywhere, but looks for surprises and possibilities in how differences are played out, and how such differences could be used for theorizing.

Another challenge is how to integrate more-than-human approaches that seek to decenter the anthropocentric perspectives that lie at the heart of most urban and environmental studies. In the humanities and critical social sciences there has been an upswing of thinking that (urban) animals have narrative capacities that can help to open up, rather than pinning down, the anthropocentric view of cities that structures policy and politics.[6] However, while such approaches attend to quite easily identifiable nonhuman subjects, what also seems necessary is to account for wider forms of bio-agency. This could follow how Joshua Lewis approaches the complex coastal ecosystems in Louisiana, where he shows us precisely how humanmade infrastructures, which have been implemented over the course of 150 years, have created a historical-biophysical complex that carries more-than-human agencies beyond simple “nonhumans” and as such shape politics in unpredictable and difficult ways.[7]

Finally—and we will return to this point below—to publish a book today on *grounding urban natures*, which contains studies from across most continents, means to face Western bias in constructive ways. Urban environmental studies, from scientific ecology to critical and poststructuralist geography and on to environmental history, are informed by specific habits of thinking history, city, and nature. We need to draw on postcolonial and decolonial scholarship to develop methods and collaborations to counter such habits and further multiply the ways through which urban natures are understood.

We now continue this chapter by taking our cues from the chapters to suggest a set of heuristics toward a repertoire for comparative urban environmental studies. Our aim is not to articulate a theoretical framework but rather to suggest a scaffold that can support study and collaboration. This aim is connected to William Cronon’s edited volume *Uncommon Ground*, which inspired our work with this volume, in which chapters and authors represented a family of attempts that could not easily have been placed under a single rubric or theory but that still made a lot of work for establishing a new ground for critical environmental studies. Our volume also rests on a family of attempts, diverse and inspiring, that aims to explicitly pluralize and rethink urban nature from multiple locations, as well as offering methods and intellectual tools that can be useful in doing so.[8]

Act of Grounding: Articulating, Texturizing, Retrosembling, and Situating

The volume is, overall, an effort to *view urban natures as multiple* through the lenses of *grounding* and *worlding*. These two main heuristics form part of our treatment of comparative environmental urbanism in chapter 1 and they reverberate throughout the book’s chapters. While grounding directs attention to how urban nature is reworked in particular places and becomes diverse through situated understandings, worlding tries to capture how places and urban natures are never only local. Instead, through the actions of experts, bureaucrats, activists, and scientists—and animals, vermin, and seeds—together with broader processes such as colonization, land dispossession, and world trade, urban natures are indeed connected from place to place. However, rather than using the meta-frame of globalization, we draw upon how anthropologists, geographers, and historians have tried to address how localities become part of the world, each in its own particular and specific way.[9] On both sides of our analytical effort—the side of the *local* through grounding and on the side of the *extra-local* in worlding—we foreground texture and particularity with the aim of creating a theoretical transaction space for dialogue and contestation wherein the local is not domesticated within the global.

The *act of grounding* translates the unity of "urban nature" as a universal object of science or a backdrop for exploitation, capitalist or otherwise, into multiple social, political, and biophysical relations.[10] Grounding, in this sense, brings material to critique and problematize the simplification of urban nature through taxonomic or ecological scientific frameworks, that is, resisting the idea that urban nature is a stable knowledge object, a thing that can be studied with the same (universal) framework wherever you go. Grounding, on the contrary, goes into the midst of social struggles over how to use, abuse, cohabit, change, understand, and contest urban nature. By tracing or uncovering urban nature through *relations*, urban nature can become pluralized and socialized and include the agency of nonhumans and the vibrancy of matter.[11] What does urban nature mean in different places? How is urban nature composed, contested, and known? What does a given array of social arrangements in-and-through urban natures tell us about the city in question, its people, country, region, and place in the world?

This stance is resonant with how "place" has been thought within relational thinking in human geography. Rather than taking an essentialist approach, we follow Doreen Massey in viewing place as a relational and historical phenomenon, brought about through associated multiple understandings that different social groups might have.[12] This relational and dynamic view, which is akin to what Torsten Hägerstrand termed the "processual landscape" (*förloppslandskapet*), foregrounds a process-driven way to understand the entanglements by which human and nonhumans come together.[13] It also resonates with what Neil Smith called "the production of nature" and what Sverker Sörlin and Paul Warde have referred to as "environing."[14]

At the core of all these efforts, including our own in this volume, lies an urge to differentiate through critical historical and social scientific methods the seemingly basic backdrop categories of "nature," "ecology," and "environment" and to let them emerge as practice-based, contested, and dynamic. Urban natures, hence, are not *other natures*, they are *differently grounded natures located elsewhere* than where we thought not so long ago that nature's conventional place was supposed to be.

Accompanying the act of grounding, we suggest four analytical tactics: *articulating*, *texturizing*, *retrosembling,* and *situating*. These are all interlinked and overlapping, but we articulate them separately to demonstrate how they build on a wider literature and gain strength when bundled together.

Articulating refers to making legible certain elements for interpretation, evaluation, debate, or struggle. This is accomplished by scientists and scholars, but also by artists, photographers, landscape architects, and journalists, including activists mobilizing to protect a park, a wetland, or an urban forest. Articulation is thus part of a very general sociomaterial practice that assembles actors, artifacts, and social arenas to construct and provide wider narratives and meanings for particular things and elements.[15] It assigns value (negative or positive) to objects, wetlands, trees, parks, and species, but also operates to define and make visible, and thus contestable, sociomaterial flows such as waste, water, or toxic substances. Articulation is the narrative practice of analyzing and making sense, and a key component of making politics about urban nature at all possible. In this volume we see articulation being used in several chapters. Jens Lachmund (chapter 9) articulates the emergence of urban ecological regimes in Berlin over a one-hundred-year period, placing each within a set of practices and moral ideas of value that shifts with technology, science, and sites—from urban nature as part of an "organic whole," to scientific urban ecology in postwar Berlin, to contemporary popular practices of community gardening. This provides grounds for critiquing what aspects and ways of knowing urban nature that these regimes hide and highlight. Furthermore, Lance van Sittert (chapter 10) narrates the construction of designated natural spaces in apartheid Cape Town, which he shows received their particular meanings within a discourse of white supremacy and racial segregation that highlights certain aspects and values of urban nature instead of others. Similarily, James Evans (chapter 11) articulates how an abstract, mobile, and science-based urban ecology framework emerged in Baltimore, Maryland.

Texturizing means attending to detail and putting effort into acknowledging *how small things matter*—"small" meaning that which may appear small from some mainstream or hegemonic viewpoint. For those building global models of urban ecology this will be a challenge, because if you travel with a strong framework in mind, a ready-made scheme to categorize the world, you will fail to appreciate the subtleties of different situations. The sensibility that comes with texturing in scholarly work is likewise intimately connected to making theory since texturizing could be understood, following James Clifford, as a "a matter of being aware of the difference that makes a difference in concrete situations, of recognizing the various inscriptions, 'places,' or 'histories' that both empower and inhibit the construction of theoretical categories."[16] However, to remain in "the local, 'experiential,' and circumstantial" is not enough; it has to be paired with an effort of working out *why* small things matter through comparative work, "looking beyond the local or experiential to wider, comparative phenomena."[17] This means that theory is not to be produced from lofty heights of abstractions ("global" or universal models, our habitual ways of thinking) but from particular locations and in the midst of detail and texture.

This tension between the assumptions we carry and the backgrounds we come from, on the one hand, and how we respond—as writers, activists, practitioners, citizens—to particular situations, on the other, drives home the productive tension between the local/particular and the global/general that needs to be kept close and explicit, and always needs to be revisited.[18] If this is not the case, the risk is that strong frameworks or concepts, such as social-ecological systems theory, metabolic rift, or biophilic/resilient/smart cities, can come to create an expectation, a compulsion in the analyst/scholar to reproduce the framework or concept, rather than attending to the texture of place and locality.[19]

Texturizing also has to do with the quality of the analytical approach. With a vast flow of research money now being spent on urban and global environmental problems, thinking seems to be forced through a *generalized* idea of "the urban." With our grounding project being about putting nature in its right(ful) place, we sense a need to resist such nontextured models and return to textured narratives. Or, as Edgar Pieterse insists in relation to understanding new modalities of urbanization proliferating across the world, we need to profoundly revise the categories by which we think cities and politics. Pieterse has suggested that while trend data and demographics are important for responding to urgent developmental needs, we also need "theoretical searching," a space for inventing new categories by which to think cities. This includes, Pieterse continues, novel collaborations with artists, poets, and other urban knowers from outside academia, plus an investment in writing and producing "intimate ethnographies" built upon long-term work in specific urban contexts.[20] We need more textured accounts to theorize the urban anew, accounts such as those developed in this volume and in particular from the emergent cities of the global South. With a recognition of more than a century-long tradition of urban scholarship, from Camillo Sitte and Patrick Geddes to our contemporaries Ananya Roy and Aihwa Ong, we aim to contribute a language of critique, or a "mid-range" theory, that can develop a more circumspect, yet more precise means for developing new sensibilities through which to think urban natures.[21]

In this book we see such work occurring when features of nature move from the emblematic to the agentive. It is when the waste-filled lands of Lagos are subject to thick descriptions that their manifold social, political, and environmental properties can emerge, as Lindsay Sawyer shows in chapter 3. Although the socioecological patterns of reproduced injustice that Anne Whiston Spirn sees in Philadelphia (chapter 4) are not dissimilar from what occurs in many cities, her intricately layered analysis of maps, school projects, and infrastructures has heuristic value in itself. This texturizing approach puts certain demands on scholars because it requires consideration of elements typically drawn from a multiplicity of disciplines. Texturizing is carefully done by Lisa Hoffman (chapter 7) as she allows us to understand the multiple roles that nonindigenous invasive plants play in the making of social relations and roles in Dalian, China. It requires attention to detail in order to appreciate the emergence of not only an object to be managed by volunteers, the "alien plant," but how volunteering itself becomes part of wider state practices of governing spaces and forming subjectivities. Urban nature becomes that lens through which what appears as disparate worlds or projects are interlinked—from the intimate and personal, to nature conservation, to norms of governing, to a site, as Hoffman writes, "to negotiate government responsibility, individual contributions, natural beauty, economic development and geopolitics." A similar connection between the intimate and local, and wider global processes of capital and forms of governing are reached through texture and detail in several of the chapters: in Richard Walker's (chapter 6) account of the San Francisco Bay Area, where urban politics combines with the history of local science and socioeconomic class patterns in a sequence of urban renewal regimes; in

Jia-Ching Chen's (chapter 12) study of the recent history of how local food production and agricultural disposession combine with hyper-fast urbanization, state-run globalizing business models, and associated development ideologies in Yixing City, China; in Amita Baviskar's (chapter 8) delicate account from Delhi about how a present-day urban leisure culture, with couples mating and dating under religious constraints, combines with the imperial planning of parks and urban ornaments to create places that were completely unforeseen and yet are both functional and aesthetic. "Interdisciplinarity" is perhaps not the most appropriate designation for these approaches; rather they make creative use of what is at hand to present the manifold entanglements of urban reality in and through urban nature.

While the two tactics described above are about paying attention to what is visible and ongoing in the present, or the proximate past, *retrosembling* is about the practice of *historicizing urban natures* from a necessarily partial and situated perspective, in contrast to a universal, omniscient framework that by default cannot exist. As such, retrosembling generates histories of urban natures that are admittedly contested and contestable. Indeed, like any historical account, it provides a selective cast of actors, institutions, objects, places, and discourses in telling a particular story.[22] Thus, it understands historicizing as a polyphonic and multiactor process, assembling the views and voices of different social groups rather than those of the single author.[23] Garth Myers's work on the "multi-vocality" of contested urban environments of African cities is instructive as he draws on, and draws in, voices from experts, tribal leaders, hip-hop artists, and novelists and their respective particular framings of cities, places, and nature.[24] The same effect happens in the cinematic ethnography film *One Table Two Elephants* by Jacob von Heland and Henrik Ernstson.[25] Through following botanists, street dancers, and a Khoisan historian, the film problematizes a linear way of narrating history, one that would rely overly on colonial archives and scientific modes of truth making, to allow the subaltern—people from the Cape Flats, the historically marginalized area of the city, and their equally serious practices of making sense of urban nature—to appear and structure the film's account.[26] Such vernacular histories can be seen as elements in a more democratic articulation of *future urban natures not yet known*.

This mode of multipronged analysis helps to dislodge singular, essentialist, and universalist ideas of nature and to emphasize instead, with Jens Lachmund, that "multiple natures are locally embedded in historically specific social practices."[27] In this book this emphasis is demonstrated through particular practices of infrastructure engineering (see Joshua Lewis, chapter 2), the vernacular use of urban parks (Baviskar, chapter 8), processes of rediscovery through work in schools and archives (Spirn, chapter 4), ecological research that redefines the functional properties of ecosystems (Evans, chapter 11), economic-bureaucratic imaginaries (Chen, chapter 12), and social cooperation among amateur and professional "urbanists," or advocates of community (Walker, chapter 6). In these and other chapters in this book, retrosembling work is undertaken to understand, from the bottom up, the formation of urban natures, sometimes intentionally, sometimes unintentionally, sometimes in wildly different ways and with profoundly conflicting functions and politics, and then to situate them into the wider urban fabric.

This process pushes to the fore the quite self-evident point that urban form and urban future cannot be reduced to a given set of standard "solutions" or "policies" that could magically and universally enhance liveability and address environmental, health, and climate challenges. Rather than relying on external or universalist frameworks, the mode of analysis we are advocating contributes to calling attention to the multiple ways through which urban nature has been and will be known, used, protected, destroyed, and reworked.[28]

Finally, we take *situating* to mean the effort to *take each place seriously* for what it offers to theory. But situating, closely connected to the term "situated knowledges" as it has been developed across postcolonial, feminist, and critical science studies, also references a concern to recognize that when we leave universal knowledge claims behind, we embrace, as phrased by Gillian Rose, that "all knowledge [including the knowledge that we make ourselves] is produced in specific circumstances and that those circumstances shape it in some way."[29] This is what James Clifford refers to (in the third epigraph of chapter 1), that when we are are involved in making sense of a wider world, that is, in theorizing, both the places we have visited (our case studies, or archives) *and* ourselves as the traveler, our own positionality (class, race, ability etc.), are involved.[30] While we recognize that the chapters of this volume has developed less critical reflection on how positionality influences the writing of accounts, there is a creative impulse across the volume through taking each place seriously in tracing the active presence of nature in the urban fabric. Urban nature is *not* treated as a backdrop or ornament or something marginal, but central in interpreting wider urban and socioenvironmental processes. Through this *situating* of their account, authors suggest new ways for thinking urban nature that in turn troubles global and universal models of urban ecology.

For instance, in both chapters 2 and 5 this situating involves juxtaposing unexpected appearances of urban nature with different forms of (urban) design. In Louisiana's vast coastal landscape, heavy cypress stumps reappeared when marshlands were dug out during the twentieth century, undermining the "great siphon," an engineering feat to linearize a vast coastal landscape to maximize port and real estate profits and to secure the city from large-scale flooding. Likewise, scorpions in chapter 5 creep up through shower grates in Córdoba to disturb modern dreams of sanitized homes; and in designing an alternative shower grate, Ávila and Ernstson can consider a much wider more-than-human geography that includes children, fear, downstream pollution, and decaying sanitation infrastructure. By situating the cypress stumps and the scorpion in the richness of the details that New Orleans and Córdoba offers, the authors demonstrate the analytical power of *grounding* (situating, articulating, texturizing and retrosembling) in undermining universal and simplistic models of urban ecology.

However, they also invite creative ideas for comparative research. For instance, what are the comparative geographies that we can assemble to explore how Promethean dreams of controlling nature are still haunting our societies today? Or, what *affective ecologies* are in the making across different urban landscapes today, those that move beyond rational, scientistic ways of formulating ecology and that include an appreciation of what binds humans and nonhumans together through fear (of scorpions and flooding) and love (of our children and survival of our city)? The book provides several more such comparative invitations. We could explore how green fields attract multiple groups of residents and experts over time in similar but different ways across the Bay Area (Walker, chapter 6), Delhi (Baviskar, chapter 8), and Berlin (Lachmund, chapter 9). And contemporary Dalian (Hoffman, chapter 7) and post-apartheid Cape Town (van Sittert, chapter 10) offer empirical terrain to think comparatively about how state-supported classifications of indigenous and "alien" plants resonates with the role that urban nature played in upholding white "civility" in apartheid. The book is pregnant with such creative comparative geographies that can inspire future research within comparative urban environmentalism.

Across these interlinked tactics, the act of grounding, consequently, translates urban nature from a simplistic or singular entity—the "urban nature" *qua* "green space" standard—into an open-ended, multifaceted, and plural idea and materiality that is a vibrant, inseparable, constantly changing element of a fluid and extended urbanity. Apart from discovering and unpacking urban natures, and speaking to and about them from various locations, this book has tried to provide examples of how different scholars have responded to the challenge of grounding. They have thus generated multiple historically and geographically specific configurations of urban nature and also demonstrated various methods of how to accomplish this. Situating, articulating, texturizing, and retrosembling are in this respect individually helpful and mutually reinforcing methods for providing historically and empirically valid presentations of the increasingly important "natural" dimensions of the urban.

Act of Worlding: Locatable Practices of Translation

Having proposed an act of grounding, from within and below, we now turn to the act of *worlding*. As an analytical alternative to "globalization" or "the planetary," world*ing* is viewed as those ongoing, continually negotiated, and locatable practices by which thought, things, and places become part of a wider world.[31] For AbdouMaliq Simone it provides a lens to explore the practices through which urban residents access and participate in a "larger world."[32] Similarly, for Ananya Roy and Ahiwa Ong, it represents the "practices that creatively imagine and shape alternative social visions and configurations—i.e. 'worlds'—that are wider than what already exists in a given context."[33] Importantly, for them, the study of the practices of worlding by actors ranging from elites to subalterns invites a mid-range theorizing that "dives below high abstraction to hover over actual human projects and goals unfolding in myriad circumstances of possibility and contingency."[34] For our approach, the worlding of urban natures is about focusing on situated practices that strive to rework socioenvironmental relations in particular places, while at the same time viewing these practices as connected in tangible ways to practices elsewhere.

It is crucial for the understanding of the current phase of urbanization that we see worlding as an empirical—that is, a historical—phenomenon in its own right. Urbanization will not adapt to proclaimed policy or theory, nor will it emulate or imitate previous phases; urbanization will first of all happen and it is essential to insist on its being available in principle for even profound redirection and change. Urbanization, however broad and sweeping, is not planetary in the sense that it is an even force that flows around the world. Nor is it in any simplistic way part of a Western trajectory of globalization or progress, from Babylon to London, Los Angeles and, lately, Lagos, as it is sometimes presented. The concept of worlding works to replace a linear and simplistic arrow of time that moves in rhythm with (European, or today perhaps Chinese) progress, with a much more interconnected, notion of time and space as folded and intertwined where a locatable center is less certain. This decentring of origin uproots a problematic linear understanding of history, tackled head-on by Dipesh Chakrabarty in *Provincializing Europe*: "[Historicism, or the writing of history] consigned Indians, Africans, and other 'rude' nations to an imaginary waiting room of history [in which all nations and cities] were headed for the same destination … but some people would arrive earlier than others."[35]

We are now in a different world. When Roy and Ong (re)launched the concept within urban studies in 2011, worlding was not only a tool to bring the global South on an ontologically and historically equal footing with the global North, but also the opposite, to equal treatment of the North. The global South is neither "the subaltern" nor an inherently progressive location, but the global South also has, as Roy insists, ideological projects toward world-dominance.[36] In the multipolar world order that has coalesced since the end of the Cold War, Brazilian, Chinese, Arabian, Indian, and other nationalist-cum-geopolitical projects are in formation.[37] It is a world where agency is distributed and effects are, too. Worlding, in this context, provides a theoretical frame in which the old pattern of an evolutionary diffusion of urban norms and standards from the global North to the global South is, if it ever were, unrealistic. Loans and impressions exist, and they are multidirectional.

Historians have contributed constructively in undermining the linear historicist paradigm. From critical studies of the Garden City or Le Corbusier planning ideas, to critiques of "the centralized networked city" in terms of basic infrastructure,[38] they have also provided yet other starting points to multiply understandings of urban natures. For their part, archaeologists and ethnobiologists have excavated what Paul Sinclair calls an "urban mind" that has origins going much farther back than the onset of urbanization in the West. Cities existed outside Europe many thousands of years ago, and urban environments have ever since retained a multiplicity of manifestations across world regions, not only in Asia and Middle East but also including the Americas, where nature was a strong presence in pre-Columbian urban centers in both South and North America.[39] This "urban mind" stretches out in space and time and decenters the place from which "the city" has been thought, providing novel locations and archives to rethink urban natures.[40]

A textured narrative approach thus also acknowledges the *historical* (or idiographic, as conceived by Wilhelm Windelband) character of cities rather than treating them as *phenotypes*, or individual representatives of a common (nomothetic) genotype or standard category.[41] Cities, in this respect, have more in common with nations, or wars, or most other historical phenomena: they do share much in common, but it is their component differences that make a difference—both for people and nonhumans of the city, and for theory construction. These differences are brought about, not through globalization or agglomeration as a "higher" force that structures cities along any simple lawlike formula, but through how ideas, technologies, and policies translate from one place to another and get "inserted" or "accommodated" in very specific ways, each gaining a dialect or flavor of the specific place. The tension between uniqueness *of* place and translation *across* places is what makes a reflective *grounding* and *worlding* comparative approach possible. In this volume, contributors have traced and retraced how apartheid and Western forms of racism were configured into forms of urban nature in Cape Town, New Orleans, and Lagos; how industrial projects linked to certain ideologies have shaped urban natures in Dalian and Yixing; and how scientific methodologies, invented in Berlin and Baltimore, have produced certain conceptions of urban nature, *qua* ecologies, which tended to hide the relational, social, or historical context from where these conceptions originated.

Locating cities in the world and taking their own trajectory and historical tensions and contestations seriously is of central concern to us. This does not mean to suggest that there is no commonality, but that thinking in patterns must constantly be referred back to empirical roots. Cities are simply so *interestingly dissimilar* that the very attempt to bring "the urban" into a formula, as for example in a "science of cities" or a global urban theory, is innately insufficient. Or put differently, urban experiences and urban spatial forms always have a historical baggage *of the world* at the same time as they are part of local politics and society, which affect their worldliness. While being in the world, they are also always unique. Worlding is, in this view, a looser kind of family resemblance, among other equally worldly, nonuniversal, and dissimilar spaces.[42]

A New Urban Narrative in the Making

This book has grown out of a range of fields, from environmental studies, human geography, and anthropology to urban history and urban studies. In our work, however, we have found how such distinctions, while obviously relevant, have failed to capture in full the integrative ambitions of our project to multiply the understandings of urban nature. To move further, we need wider intellectual collaborations—ones that also will have an effect on policy and broader discourse. There are at least four concluding points to make in developing a future agenda for comparative urban environmentalism.

First, through the sheer explosion of urban ecological and environmental studies in the last decades (which we reviewed in chapter 1), "the city" is undergoing a metamorphosis in environmental thought. In the past, naturalists contrasted the Eden of nature with the dark, Satanic mills of the city. In our time, the city has instead come to be increasingly portrayed as a wonderful organ of progress, opportunity, and, ultimately, sustainability. Neither image is realistic. While it is crucial to make "the city" central in discussions about sustainability, the new super narrative of the city—fueled by private-public partnerships high on "smart urbanism" and "green infrastructure," to grand sustainability visions of a city like Masdar City—is, if possible, even more idolized than how the city was vilified by English and North American novelists and poets in protoindustrial times. A grounding and worlding approach can slowly chip away and undermine such idealized, free-floating ideas about the city, building archives of textured accounts that can form the backbone of future scholarly projects and help to tie discussions about the future of cities and urbanization back into real cities and places.

Second, we see a possibility to work more closely with the emergent field of environmental humanities and draw upon its creative way of expanding the humanities to speak eloquently and richly into the environmental question, decentering the authority of the natural sciences. Through mobilizing much wider registers of knowing and engaging the public from the archives of humanist practice, from filmmaking, theater, literature, and art, there is a rapidly evolving set of methods and frameworks that urban environmentalists can draw upon.[43] Our inclusive approach can challenge—and complement—the sciences by partnering with the environmental humanities and use research as a way to attract and co-create publics that matter in public discussions.

Third, even as we have emphasized localized and situated methods of working, we also need to address the growing discourse on *the planetary*. An earthlier geohistorical notion, operating on a wider scale than "the global" or "the world," "the planetary" invites work that crosses the nature/culture divide and speaks to ways that urbanization is intertwined with climate change and ecological upheaval. Such a perspective is exemplified, on the one hand, in the environmental humanities by works like those of Ursula K. Heise (*Sense of Place and Sense of Planet*) and Timothy Morton (*Hyperobjects*).[44] What might it mean for a grounding and worlding approach to take cues from this intellectual terrain? It could mean to draw on eco-critical approaches from literary theory to think planetary living in and through more-than-human city living; or, to follow Bill McKibben in his book *Eaarth,* to trace out what a defamiliarized and already profoundaly changed planet feels like and is understood to be in a world of cities. "The planetary" has also been mobilized within neo-Marxian approaches as the "planetary urbanization" thesis. Developed from Henri Lefebvre by Neil Brenner and Christian Schmid, it, too, undermines the dichotomy of nature and culture, but with an explicit and expansive urban lens.[45] Rightfully critiqued since "the planetary" is too crude a signifier to make sense of the multiplicity of urban politics in a world of cities, which we have argued for here,[46] this analytic is nonetheless able to grasp, as does Martín Arboleda in his study of a Chilean mining town, an urban system that has reached a planetary level never attained before:

> [Planetary urbanization] constitutes an important analytic to understand new forms and scales of urban fetishisation [i.e., how capitalist urbanization hides the sites and networks of its own production]. Indeed, operational landscapes like Huasco, which have been completely engineered to provide low-end energy for the extraction of raw materials destined for consumption in remote corners of the globe, are the geographical imprints of these expanded, wide-sweeping metabolic exchanges [i.e., flows of materials and capital]. Like the sewage and piping networks that feed the life of cities…, Huasco—as a provider of cheap energy—has also been hidden from view [in feeding planetary urbanization].

In comparison to techno-scientific attempts to frame urbanization at a planetary level, from Earth System Science–inspired models to digitial mapping techniques and the now famous nighttime satellite images of Earth often drawn upon in popular discourse, the planetary urbanization thesis insists on the uneven nature of capitalist development, undermining such depoliticizing viewpoints as that of viewing "the planet" as a home for us all, a "spaceship Earth," or associated notions of "Earth Stewardship" and a "good Anthropocene." As Jason W. Moore puts it, "the genius [of capitalism] was to represent time as linear, space as flat, and nature as external."[47] The lesson is that if social relations of power, production, consumption, and so on are not changed, then neither will the conditions that can enable a more sustainable and just urban living on the planet. A grounding and worlding approach to urban nature can certainly stand in a dialectical, and thus productive, relation to the planetary urbanization thesis. The rubbing against each other of a neo-Marxist analysis with and against postcolonial openings, the planetary with and against the textured and the minute, could provide the space for students and activists to think critically and emancipatorily through textured places and unsettle mainstream taken-for-granted ideas on how to tackle "global" or "planetary" environmental challenges.[48]

Finally, it is indeed intriguing to speculate about the possible emergence of a new urban narrative, something that can hold our different projects of research, activism and practices together. Ananya Roy has invited "genres of urban scholarship" to gather a field in an inclusive, yet not cosy consensual way.[49] Surely it will not be a single narrative, but many narratives and imaginaries that can guide how we work, how we think, and what we aim for. Such an enterprise would not only be useful for transformational work on the emerging cities and their environments of tomorrow, but would assist in profoundly rethinking the idea of the city or "the urban" itself. If von Thünen nearly two centuries ago developed a textbook version of "the city" as a concentric distribution of production and consumption, this is now not only a relic, but also the image of a highly hierarchic, nonsustainable, and unequal city.[50] The new models and imaginaries that are now populating urban theory, from "world of cities," to "ordinary" and "worlding" cities, to "mobile"/"rouge"/"black"/"translocal" urbanism, to "cities at the speed of light," or "planetary urbanization," offers new lines of flight to help rethink our urban world, its relation to the environment, politics, and ourselves.

Grounding and worlding as a means for understanding practices and places in textured ways and as connected to multiple elsewheres, offers a possibility of not losing ourselves in either the "walled segregation" of the particular or a "dilution in the universal," as phrased by Aime Césaire.[51] These ideas can carry real weight in the necessary work to question and undermine simplistic models and inherited biases of what the city and the environment represent. They can push for reform in urban thinking in professional education and policy formation. And they can assist in writing from multiple locations to uncover urban natures and their political ecologies past and future.

Notes

1. Quotations from Whatmore (2009, p. 595), with references to Isabelle Stengers and Bruno Latour. See also Lewis and Ernstson's (2019, section 2.4) work on "situational dissensus" in Louisiana coastal landscape.

2. Robinson 2014.

3. McFarlane 2009.

4. See McCann and Ward (2011), who emphasise how this circulation is globally uneven, structured by capital and knowledge production.

5. Ranganathan and Balazs 2015.

6. van Dooren and Rose 2012.

7. Lewis, chapter 2 in this volume; Lewis and Ernstson 2019.

8. Rather than, as Giovanna Di Chiro (1996) writes in the concluding chapter of *Uncommon Ground* (Cronon 1996, p. 452), as "a unified statement [to] reassure 'common ground,'" the commitment was "to develop … a critical discourse about 'nature' and 'environment' that did not attempt to come to final closure [but to] move toward 'uncommon ground.'"

9. Said 1983, pp. 24, 226–235; Simone 2001; Tsing 2005; Roy and Ong 2011.

10. See chapter 1, where we develop our critical, reflective approach based primarily on postcolonial approaches. As we write there in an endnote, we are not building from, nor developing "grounded theory" (Glaser and Strauss 1967).

11. Latour 2005; Bennet 2010.

12. Massey 2005.

13. Hägerstrand 1993.

14. Smith 1984; Sörlin and Warde 2009, pp. 1–19.

15. We have studied social articulation as a key entry point to understanding environmental struggles. See Sörlin (1998), Ernstson and Sörlin (2009, 2013), Ernstson (2013), and Erixon Aalto and Ernstson (2017).

16. Clifford 1989, p. 4.

17. Ibid.

18. See chapter 1 this volume on this point, with reference to Said (1983), Clifford (1989), and postcolonial/Southern urbanism (Parnell and Oldfield 2014).

19. Law 2009; Mol 2010; Ernstson and Lewis 2013.

20. Pieterse and Simone 2012; Pieterse 2014.

21. From a rich literature, including Sitte (1889); Anderson (1923); Geddes (1947) (with a historical critique by Datta 2013); and Geertz (1973).

22. See Cronon (1992), and often emphasized by Swyngedouw (2004).

23. The concept of *retrosembling* can be seen as bringing together a set of words—“resembling,” “retrofitting,” “assembling,” and “reassembling”—that can help in thinking about how to write history. “Resembling” relates to the notion of constructing something that carries validity and truth; “retrofitting” involves going back in time to trace urban natures to their local roots, thus enhancing the practice of urban history; and “assembling” or “reassembling” is a conscious act of responsibly constructing an account that is partial and situated, yet evidence based and creative, as in for instance Bruno Latour’s *Reassembling the Social* (2005).

24. See, for instance, Karvonen and Yocom (2011); Myers (2016, 2019); Erixon Aalto and Ernstson (2017).

25. The film (von Heland and Ernstson 2018) interrogates how race, nature, and knowledge are intimately intertwined in Cape Town as a postcolonial city and is inspired by Jean Rouch’s (2003) work on “ciné-ethnography,” but also on Premesh Lalu’s (2009) *The Deaths of Hintsa*, which poses the question on how to write history in the postcolony.

26. The *histories of the margin* are not marginal at all, but rather make way for Dipesh Chakrabarty’s (2000) idea of *History 1* (of capital) and *History 2* (of subalterns) as dialectically intertwined.

27. Lachmund 2013, p. 237.

28. McFarlane and Robinson 2012.

29. Rose 1997, p. 305.

30. As concepts, *situating* and *situated knowledges* draw upon the sensibilities developed by Edward Said (1983) and Gayatri Chakravorty Spivak (1988) in postcolonial studies,

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metropolis with those of a simple, close-to-nature countryside life.”[11] The concept showed many parallels with the garden city ideal as well as with the program of modernist urbanism of the Athens Charta.[12] It shared with the latter a preoccupation with a spatial separation of urban functions and the call for vast open spaces that would connect the city to its surrounding landscape. The core idea was to shape an “organic” morphology of the city, which itself was an attempt to engineer an equally organic form of social life.[13] In this respect the approach has similarities with *Landschaftspflege* (landscape care), which had earlier attempted to integrate traffic and industrial infrastructures “organically” into the natural landscape. Although the longing for organic forms was not restricted to Germany, it was especially here that it gained in popularity in the Weimar years and notably under National Socialism, when planning for postwar reconstruction embraced the city landscape ideal.[14] The term “organic” received its rhetorical punch through its semantic opposition to the “mechanical,” which was associated with density, right angles, disconnection from surrounding landscapes, and a supposed lack of social bonds among the inhabitants. In a trendsetting textbook on “organic urbanism” from 1948, Hans Bernhard Reichow portrayed the city as a machine, alienating its residents from nature.[15] In contrast, an organic city would consist of a hierarchy of nested units: cells, neighborhoods, districts. In 1950 the conservative garden designer Gustav Allinger dreamed of Berlin as a “new city,” one that would be a “living organism that is connected to nature.”[16] In the same vein, Johannes Göderitz, Roland Rainer, and Hubert Hoffmann characterized their ideal of an “articulated and low-density city” as a “spatially loosened, yet functionally closely entangled texture of single cells of human size.”[17] The term “organic” pointed mainly to the morphology of the city as conceived from the bird’s-eye perspective of the planner’s table. The city should extend smoothly into the surrounding landscape and its material design should imitate natural forms. By structuring the city into small “organic” segments of neighborhoods, planners also wanted to reconstitute close community bonds within the modern metropolis.[18]

The concept of organic urbanism was the basis of the 1946 Kollektivplan for the rebuilding of Berlin, developed by a planning team led by the architect Hans Scharoun.[19] It envisioned a radically restructured city, consisting of dispersed modernist buildings, clustered into homogenous neighborhoods, and cut through by highways and green spaces. Whereas the plan and Gillian Rose (1997) and Donna Haraway (1998) and others in eco-feminist and critical science writing. More recently, there have been important developments in this direction of feminist (Truelove 2011; Harcourt and Nelson 2015), embodied (Doshi 2016), and postcolonial/situated urban political ecology (Lawhon, Ernstson, and Silver 2014; see also Ernstson 2013; Silver 2014; Lawhon et al. 2016).

31. Tsing 2005; Roy and Ong 2011. As a concept, worlding has a long tradition; in particular in Edward Said (1983, pp. 21–24, 226–235), who, in discussing "worldiness" and the role of the (literary) critic, emphasized the need to be connected and grounded when one make judgments about the world: "For Said," here quoting from Pal Ahluwalia (2005, p. 141), "theory can be effective only when it is located firmly within the world," meaning that it needs to be connected to real places. Or else we risk "affirming the values of our, that is, European, dominant elite culture" (Said 1983, p. 21).

32. Simone 2001. For an example, see Colin McFarlane's (2009) discussion about "translocal assemblages" in relation to the Slum-Dwellers International social movement to exchange practices, methods, and experiences of resistance and learning across cities of India, South Africa, Zimbabwe, the Philippines, and elsewhere.

33. Roy and Ong 2011, e-book location 662.

34. Ibid., e-book location 656.

35. Chakrabarty 2000, p. 8.

36. Roy 2014.

37. Cardoso 2015.

38. For historical studies, see the edited volume by Bigon and Katz (2014) on *Garden Cities and Colonial Planning* with studies from Africa and Palestine, Glover (2012) on the garden city in India, and Nilsson (2006) on water and sanitation systems in Kampala, Uganda. For recent critique and arguments to move beyond the imaginary of the centralized networked city, see Furlong (2014); Silver (2014); Coutard and Rutherford (2016); Monstadt and Schramm (2017); Lawhon et al. (2018).

39. Fernández-Armesto 1987; Heckenberger 2009; Barthel, Sörlin, and Ljungqvist 2010; Sinclair et al. 2010.

40. *The Urban Mind*, edited by Sinclair et al. (2010) reinterprets ancient forms of urbanization as economy, culture, and ecology and includes studies of Istanbul, the Middle East, and Pre-Colombian civilizations of Latin America.

41. Wilhelm Windelband (1901) developed the Neo-Kantian terms "idiographic" and "nomothetic" to describe two distinct approaches to knowledge: either a tendency to specify and understand the meaning of contingent, unique, and often cultural phenomena (typical for the humanities) or a tendency to generalize and derive laws to explain a phenomena (typical for the natural sciences).

42. Wittgenstein 2001 [1953].
43. Sörlin 2012; Heise, Christensen, and Niemann 2017.
44. Heise 2008; McKibben 2010; Morton 2013.
45. Brenner and Schmid 2012; Arboleda 2016.
46. Leitner and Sheppard 2016; Peake 2015.
47. Moore 2014, quotation from second paragraph.
48. Ernstson and Swyngedouw 2019.
49. See Roy (2014, p. 13), as well as Robinson and Roy (2015, p. 182) on "global urbanisms."
50. von Thünen 1826.
51. Césaire 2010 [1956].

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biodiversity of the forest and reminding them that it is their protection that has sustained this grove over the centuries, the environmentalists hope to revive a collective sentiment that will enable them to fight together for the future of Mangarbani. Even as the Baba's spiritual hold on the villagers seems to be becoming more tenuous, environmentalists have stepped in with ecological arguments about respecting all life forms, the interconnectedness of trees, soil, water, and air, and living in harmony with nature—arguments that at times resemble the tenets of a secular religion.

The Delhi Ridge

The sensibility that underlies the environmentalists' efforts—their appreciation of Mangarbani as an original ecological place worthy of protection—is both modern and recent. Although many of the cities that flourished at the site of present-day Delhi over the last two millennia had established systems to harness water and to source timber and fuel from the hinterland, as well as having designated land use based on topography and soil, they did not set aside any area for its ecological importance. Delhi's two major natural features—the river Yamuna and the hilly Ridge—went virtually unregarded until the 1970s, even though they together defined the catchment that watered the wells and ponds crucial for the city's existence.[16] The idea that these landscapes are valuable and demand special attention emerged only when Delhi's expansion had decimated them or severely damaged their ecological integrity. Ironically, as is often the case, the champions of these beleaguered urban ecologies emerged from the very middle classes that were the beneficiaries of urban growth.[17] That is, the changing Ridge and the burgeoning middle classes evolved together, each giving shape to the other.

"The Ridge" is the colonial term for the area locally known as *pahadi* (hilly land), a series of undulations that begin close to the river in north Delhi and stretch to the southwest, where they are increasingly distant from the river. Images from the nineteenth century depict the Ridge as an open, unpopulated wilderness, with barely a tree in sight. Perhaps such a view was a product of perspective: British and Indian eyes would have passed over the thorny scrub forest as a wasteland because it lacked useful or imposing trees. The Ridge may also have been laid bare over the years as trees were cut to provide city dwellers with fuel and livestock with land for grazing.[18] However, its barren contours were to turn green in the next century.

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10. Temples sprout up almost overnight on city pavements, in the crevices of peepal (*Ficus religiosa*) trees, as kiosks set into walls, on abandoned plots of land, and in squatter settlements as a bid to stake claim to land that a state soft on "hurting religious sentiments" is reluctant to act against. From a small icon, to tiled and cemented surrounds, to concrete canopies and domes is usually a series of quick steps, as is the emergence of a thriving spiritual economy of patrons, priests, vendors of ritual offerings, and worshippers. However recent their vintage, temples tend to announce themselves as *pracheen* (ancient) from the get-go.

11. Boosters style Gurgaon as the "Millennium City," a destination for corporate offices and high-end residential projects with names like Belvedere Towers and Malibu Towne. But first among the basic infrastructural amenities absent in the city is water. Overexploitation has depleted the aquifer; groundwater is brackish. The more Gurgaon's affluent population grows, the worse its water problems (Soni 2000). Environmentalists have so far not been successful in either regulating groundwater extraction in Gurgaon or instituting rainwater harvesting on a significant scale. For an account of unregulated urbanization and the creation of landscapes of inequality on Delhi's periphery, see Soni (2000) and Chatterji (2013).

12. Shrivastava 2013.

13. "No Tourism Activity" 2014.

14. Palash is *Butea monosperma*; amaltas is *Cassia fistula*.

15. Krishen 2006.

16. For an account of the changing place of the Yamuna floodplain in urban political economy and ecology, see Baviskar (2011b).

17. Cf. Williams (1972).

18. According to forester R. N. Parker (1920, p. 25), this is likely to have occurred after the 1857 mutiny because, at that time, the vegetation was thick enough for "the attacking [British] force to advance 'concealed in the brushwood stretching up to within musket shot of the walls' [of the Mughal city of Shahjehanabad]." It is also reported that Firoz Shah Tughlaq, sultan of Delhi from 1351 to 1388, planted trees on the northern Ridge and used the area for hunting.

19. Letter from Hardinge to Edwin Lutyens, August 19, 1912, quoted in Krishen (2006, p. 37).

20. Letter from Hailey, Secretary, Notified Area Committee, January 13, 1916. Hailey went on to become the chief commissioner of Delhi (1918–1924). Delhi State Archives.

21. The scientific name of *siris* is *Albizzia lebbek*.

22. Department of Horticulture of Government Gardens 1936, p. 8.

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research. The third is the more recent movement of “urban civic gardening,” as I call it here, which involves the active appropriation of green spaces as sites of urban sociability and food production. These three regimes were not confined to distinct periods. Rather, discourses and practices of earlier regimes continued to exist in later ones, resulting in tensions that this chapter will touch on as well.

The Quest for an Organic Landscape

The showpiece of the International Construction Exposition Interbau, which took place in Berlin in 1957, was the Hansaviertel, a central neighborhood that had been destroyed during the war and had been rebuilt according to the ideal of so-called organic urbanism,[5] a nature regime that took shape in the discourses and practices of city- and green planners in the two decades after World War II in West Germany. The guiding rationale of this regime was to transform cities into *Stadtlandschaften*, literally urban landscapes.[6] In contrast to later nature regimes, organic urbanism operated almost exclusively through top-down planning schemes for the rebuilding of cities or even for the design of new towns, such as Sennestadt in the North Rhine–Westphalian region. Citizens figured only as the downstream targets of public campaigns, such as exhibitions that sought to garner support for the new planning ideal. They did not, as we will see with the later regimes, engage citizens as active co-agents of knowledge- and city-making.[7]

According to the proponents of *Stadtlandschaft*, the destruction of German cities during the war offered a unique chance to create an alternative to the classic European city with its dense and highly populated inner districts.[8] In Berlin the rapid growth of the city in the late nineteenth century had resulted in densely developed areas with five-storey tenements with rear buildings and tiny courtyards. These so-called *Mietskasernen* (rental barracks) were criticized not only on aesthetic grounds. The labyrinth of dark rear buildings in which mainly working-class people lived were considered to be breeding grounds of disease and moral deprivation in the view of urbanists and the wider urban bourgeoisie in Germany.[9] Once infamous as the “largest *Mietskasernenstadt* of the world,”[10] bombed Berlin became the target of far-reaching proposals for transformation.

As Hans Bernhard Reichow put it in a trendsetting textbook, the creation of a *Stadtlandschaft* would allow “combining the advantages of the big

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and Chauburja, a mausoleum from the same period, were spruced up. The Ridge was now accessible and inviting to middle-class citizens.[30]

Once manicured, sections of the Ridge were enthusiastically incorporated into the social geography of residents of well-to-do neighborhoods in the vicinity. Morning walks—the quintessential quotidian practice of urban Indians with sedentary lifestyles—bring cars to the gates of the Ridge, from which middle-aged men (and some women) alight, all wearing the sports shoes that declare their commitment to their fitness regime. They stride briskly along the paths, swinging their arms, breathing deeply to fill their lungs with the clean morning air. Some stop to stretch, a few jog; groups do yoga and laughter therapy. Others carry small packets of grain which they scatter at designated spots, charitably feeding flocks of parakeets and pigeons. Still others carry bananas to feed the rhesus macaques that infest the Ridge, their numbers proliferating on food offerings from Hindus who consider them a *roop* (incarnate form) of god Hanuman. After their vigorous exercise, many morning walkers head for the fruit vendors standing near the parked cars to drink coconut water and eat nutritious fruit such as papaya. Then they get back into their cars and drive home to bathe and start the workday.

While the crowds of morning walkers attest to the success of the project of taming the Ridge and encompassing it within the ordered realm of the city, a different facet of this accessibility becomes apparent later in the day. By late morning, well after the fitness enthusiasts have departed from the scene, the rows of parked cars outside the gates are replaced by motorcycles. Walking up the now-deserted paths, one encounters only hopeful families of macaques looking for handouts. But on the lawns, under shady trees and behind sheltering shrubs, there is a discreet but nonetheless palpable buzz of activity. Each semiconcealed spot that offers some privacy harbors a pair of young lovers looking for solitude. In a city where young women are subject to family surveillance and escaping the censorious public eye is difficult for romancing couples, the gardens of the Ridge offer refuge. As Radhika Chandiramani writes: “There’s safety in the park. The park sets limits.” They hold hands, press palms together, play with each other’s fingers. . . . Privacy lurks in public spaces; pleasure lies in the palm of a hand.”[32] Paradoxically, the public park, where visibility is coupled with anonymity, allows a retreat from the public into a realm of privacy for partners of various sexual persuasions. Rendering the Ridge safer for citizens by converting the forest into a wooded park created a space that enables

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